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AMERICAN JOURNAL OF OPHTHALMOLOGY

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THE TEACHING OF OPHTHALMOLOGY IN AN UNDERGRADUATE MEDICAL SCHOOL

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This outline by the Professor of Ophthalmology at the Medical College of Virginia, details in brief the teaching given at that institution to its undergraduates. It is designed to train the student of medicine in ophthalmology as a part of his medical, not surgical, equipment. If emphasis is given to any one phase of the subject because it is of special interest to the lecturer, it may well serve to fire the enthusiasm of the student for this or other features of his medical work. Read before the Pan-American Medical Association in March, 1934.

How should ophthalmology be taught to undergraduates? This is a mooted question. We shall probably all agree that the old custom of inflicting didactic lectures upon the students, covering precisely the ground already covered in their textbooks, is a waste of their time. We may also agree that the surgery done in the amphitheater with an entire senior class seated at a respectful distance is a grandstand play which can, by no conceivable stretch of the imagination, be regarded as a benefit to anybody except the operator, and to him only if he can talk fluently enough to make the students admire his skill while forgetting the extremely low visibility of the field of operation from their point of disadvantage. The futility of our older teaching methods is obvious and any change is probably an improvement (and many changes have been made in the past decade); but the question of just what constitutes the best course in ophthalmology, as to hours and content, is not so certain. Perhaps no hard-and-fast curriculum can be planned which is best for all schools. One institution teaches medicine as a branch of the biologic sciences; ophthalmology is a science comparable to physics and mathematics. Another institution teaches medicine mainly as an art to be acquired by men and women who are to become practitioners. It is scarcely permissible that identical courses of instruction in ophthalmology be required in these two types of institution.

This communication attempts to outline a course in ophthalmology which gives the student credit for forty-eight hours of work towards the M.D. degree, a course designed to fit the needs of an average school of medicine, a school which requires two years of preliminary academic work including the usual premedical science courses, which graduates about ninety students each year, which utilizes teaching hospitals with 400 beds, and has an outpatient dispensary with 5,000 visits to its eye department each year, of which 1,000 are new patients, somewhat more than two thirds of them coming during the eight months devoted to teaching. This is not offered as an ideal course but as one worked out from eighteen years of experience, with certain definite objects in view, and one which seems to serve its purpose fairly well. Some objections to it are evident, and criticism is welcomed by the writer and his staff.

I. In the **sophomore year** the students of the Medical College of Virginia first come in contact with the ophthalmologist. The Department of Medicine requests a member of the Department of Ophthalmology to give one lecture (two hours) each year to this class as part of a course in Physical Diagnosis. This course is designed to prepare the students for their dispensary and ward work. The lecturer re-

views briefly the anatomy and physiology of the eyes and outlines the various methods of examining the eyes in so far as these constitute part of a general medical examination, and emphasizes the practical, clinical bearings of the information thus obtained without any elaborate equipment. Inspection and palpation are utilized here, as in the case of other organs.

II. **Didactic course** to the **junior class** (eight hours): The entire class hears one lecture (one hour) each week for the last eight weeks of the session. The following subjects are covered, of course not minutely:

1. Embryology and Anatomy of the Eye, emphasizing the origin of the retina from the neural ectoderm and the consequent fact that the visual pathway is an essential part of the brain (three neurons being represented in the retina itself, the so-called optic nerve being a cerebral pathway).

2. Physiology of the Eye and Physiologic Optics: the types of refractive errors; the significance of the several types; the uses of glasses; the hygiene of the eyes.

3. General Diseases as manifested in the eye: syphilis and tuberculosis, their lesions as seen in the several tissues of the eye; their seriousness and their therapy, especially the use of tuberculin and modified antiluetic treatment (mercury and bismuth, intensively, before the administration of arsenicals; the avoidance of iodides in acute ocular inflammations).

4. *Ibid.*: Cardio-vascular and Renal disorders, blood dyscrasias, diabetes.

5. Chronic Glaucoma, illustrating the seriousness of an insidious eye disease, the importance of failing vision in elderly persons (not always due to cataracts), and the value of perimetry as a diagnostic measure.

6. Neurologic Disorders Affecting the Eye: tabes dorsalis, encephalitis, migraine, multiple sclerosis, etc.

7 and 8. Ophthalmic Examinations as aids in the diagnosis and localization of intracranial lesions, being mainly a discussion of neuro-surgical cases, with respect to the significance of eye grounds, visual fields, and ocular-muscle palsies.

This course is given largely by means of lantern slides. It is so designed that the student cannot prepare for the examination by reading any one or two text books. It calls forth his knowledge of numerous subjects outside of ophthalmology, and aims to show him the value of ophthalmology in his wider field of interest.

III. **Dispensary course**, to the **senior class** (32 hours): Sections of 10-12 students attending two hours per day, four days per week, for four weeks. Students are taught to take histories, record vision, and make an external examination of the eyes of new patients and to discuss these cases with an instructor. The use of the ophthalmoscope is required, mainly to learn the normal fundus. On two days of each week (1-1.5 hours each) a clinical lecture and demonstration are given in a classroom adjoining the clinic rooms (eight meetings for each section of the class) for the purpose of drilling the students in certain essentials which, we believe, every practitioner of medicine, whatever his especial line of work, should know. These are the following:

1. Acute conjunctivitis, acute iritis, acute glaucoma; their symptoms, differential diagnosis, and treatment.

(a) Conjunctivitis is presented as an ectogenous infection, a common disease requiring emergency treatment, and at times serious. The opportunity is taken to review the student's knowledge of bacteriology. Gonococcus infections, infantile and adult, are discussed, prophylaxis and the care of contagious diseases being emphasized.

(b) Iritis is presented as an endogenous disease, involving a medical problem of concern to every physician, the eye disease being only a local manifestation of the primary infection elsewhere in the body. The etiology is discussed, the plan of study of such cases is outlined, and the local treatment explained. This subject furnishes an opportunity to discuss the important problem of focal infections.

(c) Acute Glaucoma is presented as an emergency par excellence, a comparatively rare disease, but one destructive of vision, demanding prompt treatment and early operation. The disas-

trous mistake of confusing it with iritis is emphasized.

2. Corneal Diseases are presented as illustrative of the processes of inflammation, acute and chronic; interstitial keratitis and corneal ulcers are described from the standpoint of pathology. The student's knowledge of pathology is thus reviewed. The need of transparency of the cornea, the vulnerability of a nonvascular tissue and the seriousness of corneal opacities are explained. The integrity of the cornea as an index to diagnosis and prognosis is emphasized. Certain therapeutic indications are discussed; e.g., heat in its various modes of application, specific drugs (optochin, zinc sulphate), protective dressings.

3. Squint in childhood is presented as an example of serious visual disturbance as well as a disfigurement. The relationship of convergence and accommodation is explained; the importance of very early treatment is emphasized; the duty of the family doctor and pediatrician to give intelligent advice concerning this problem is impressed upon the student, and the neglect of eye conditions by physicians who are not ophthalmologists is deprecated.

The several types of eye diseases are shown to the students as opportunity arises. Usually all of the above mentioned, except acute glaucoma, can be demonstrated to each section of the class. Chronic glaucomas and secondary glaucomas can always be shown. Charts, stereoscopic pictures, fundus paintings, crayon drawings, and gross and microscopic specimens are used freely.

Various other diseases are encountered in the routine conduct of the clinic, emphasis being laid always upon the general medical and surgical aspects of the cases. Students are required to study the histories of these patients as recorded in other departments (pediatrics, medicine, neurology, etc.) which the patients may have already consulted.

IV. **Externe service:** Each member of the section of the senior class which is on duty in the dispensary is assigned one or more patients in the eye service of the hospitals as part of his general surgical externeship. The student is expected to take a detailed history, make a thorough general examination with more detailed description of the eye condition, to do the routine laboratory work, and to make daily progress notes. The student is directly responsible to the Resident in Ophthalmology for these duties and the Resident is available for direction and counsel during at least one half of each day.

V. **Ward rounds** (4 hours): The same section spends one hour each week for four weeks on ward rounds. Here the student is expected to demonstrate the cases assigned to him, for the benefit of the section, and the cases are discussed by the instructor. In addition, an effort is made to secure a different type of case from that seen in the dispensary; indeed the cases selected for demonstration are often from other services. Thus, cases of hypertension, of albuminuric and diabetic retinitis, fundus changes in the toxemias of pregnancy, exophthalmic goitre, orbital cellulitis from sinusitis and sinus thrombosis, papilledema of brain tumor, tabetic atrophy, etc., are available from time to time. Cases admitted on the eye service are utilized principally to illustrate the care of emergencies, such as penetrating wounds, intraocular foreign bodies, traumatic cataract, burns, gonorrheal ophthalmia, etc. In brief, ophthalmic emergencies and ophthalmic diagnosis in relation to general diseases are the principal subjects for instruction on the wards.

Surgery occupies a small place in this curriculum*. The student is told that certain conditions are amenable to surgery, that certain results may reasonably be expected, that certain conditions constitute surgical emergencies; but beyond this his experience in the operating room is usually limited to following those patients who have been assigned to him as part of his

* Ophthalmic surgery is a matter of the utmost importance to the staff itself, though not to undergraduate students. It is the duty of the head of the department to train the junior members of his staff in this difficult field, so that the public may be adequately served.

general ward duties. Students on duty in the eye clinic are informed of operations scheduled and are invited to attend if they desire and will not thereby neglect required work elsewhere. When they do attend in the operating room they are instructed in the pre- and postoperative care of the patient and the methods of anesthesia, and the operation is described. One or two students can actually see the operation. Obviously, a large number cannot see it with any satisfaction. It is most emphatically believed that ophthalmology, so far as the teaching of undergraduate medical students is concerned, is a medical branch and not a surgical branch.

What of the personnel of a department conducting such a course in ophthalmology? The distribution of teaching duties will naturally vary from year to year. At present our department is composed of a professor, an associate professor, an associate in ophthalmology, an instructor, and two assistants. The lecture to the Sophomore class is delegated to some one of these; the didactic course to Juniors is given by the professor and assistant professor; the ward rounds are conducted by the assistant professor; the clinical lectures are given mainly by the professor, but partly by others; the associate and instructor help in the demonstration of routine clinic cases and supervise the taking of histories and the systematic examinations of patients by students. It is advocated that at least two members (the same two) of the department should be in daily attendance through the week. As a matter of fact there are usually four members present on any given day who can divide the duties of the clinic among them.

From this résumé it is obvious that ophthalmology as a specialty is not taught. On the contrary, ophthalmology as part of general medicine is taught. The students are required to know nothing more than what the intelligent general practitioner needs to know in order to handle emergencies and to advise his patients as to the significance of their eye troubles.

Does this course lean too far in certain directions? Why should neurology have so large a part in the curriculum? Actually its larger place is due to the writer's interest in this subject. Another teacher would emphasize another aspect of his specialty. This suggests a problem of pedagogy. Is it not the duty of teachers to dwell largely on their special interests? Thus, a group of teachers will give their students enthusiastic instruction in a variety of subjects. Obviously, all of medicine cannot be taught to students. Intensive study of certain phases of certain subjects, with enthusiasm, encourages intensive study and arouses enthusiasm in students. Stereotyped teaching of everything, in the same way, at the same time, in all medical schools is undesirable. Why should the course in ophthalmology be the same in every school? Might not ophthalmology be utilized as a practical drill in pathology in the curriculum of some schools? It serves such a purpose remarkably well. Might not eye-ground diagnosis be taught as a major interest in physical diagnosis? It will not hurt a student to gain proficiency in this diagnostic method. We need not give any specialty an undue preponderance; but we may give due scope to special enthusiasm within the curriculum. Men may count for more than model courses. I recall some of my teachers of twenty-five years ago. What they taught may be of little importance today; what they were is of great importance to a generation of physicians practicing today. In the school with which I am connected, Roentgenology was a department of dominating importance for years because of the forceful personality and the sterling merit of its professor; his influence was never confined to the teaching or practice of a narrow specialty*. Who can say that character is of less value than technical knowledge in the service that a teacher renders to his students?

Professional Building.

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* I refer to the late Dr. Alfred L. Gray, an honored and beloved physician of Richmond, Virginia, a pioneer in roentgenology, past President of the American Roentgen Ray Society and formerly Dean in the Medical College of Virginia.

STREPTOCOCCI IN INFLAMMATIONS OF THE EYE

Report of 18 cases

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Streptococci were isolated in 18 of a series of 520 cases of inflammation of the eye and adnexa. Streptococcus hemolyticus, Streptococcus viridans, or Streptococcus nonhemolyticus was recovered in pure culture in 9 cases but in the others, other bacteria were also present. The virulence was variable.

The location, symptoms, and clinical course are discussed.

Three types of streptococcal conjunctivitis, i.e., pseudomembranous, lacrimal, and acute conjunctivitis associated with some skin disease, are reported; a fourth type, occuring in the newborn, is referred to in the literature. Streptococcus is an infrequent cause of conjunctivitis. The organism is not an epithelial parasite, apparently growing in subepithelial tissues in two cases, and in the remainder, multiplying in the conjunctival secretions and producing a conjunctivitis by action of exotoxins. From the Department of Ophthalmology, College of Medicine, State University of Iowa.

Streptococcal infections of the eye and adnexa are comparatively infrequent. According to the literature, infections of the lacrimal sac are the most common, and secondary conjunctivitides complicating erysipelas, scarlet fever, impetigo contagiosa, erythema multiforme, and measles are seen occasionally. More rarely streptococci have been isolated from pseudomembranous conjunctivitis and many authors[1] believe the organism is capable of producing that disease. A simple primary streptococcal conjunctivitis is extremely rare[2]. Cases of streptococcal conjunctivitis in the newborn have been reported by Weigelin[3] and Haupt[4], and a similar case with necrosis of the bulbar conjunctiva by Leber and Wagenmann[5].

Streptococcal ring abscess of the cornea or panophthalmitis may follow perforating injuries, cataract operations, or metastatic lesions of the uvea in puerperal sepsis, surgical pyemia, or other acute infections. Orbital cellulitis with abscess of the optic nerve, from which streptococci were cultured, was reported by Reis[6], and two cases of perineuritis occurring as a complication of streptococcal meningitis were recorded by de Lieto-Vollard[7]. Streptococcal infections of the orbit may occur with injuries, facial erysipelas, or extension of infection from the paranasal sinuses.

The importance of streptococcus in ocular diseases, however, is not generally recognized. Lindner[8, 9] and Fodor and Vlasits[10] state that it never produces a conjunctivitis. Howard[11] does not discuss the organism in his report on conjunctival and corneal infections; he merely states that intraocular infections occurred only with metastasis. Axenfeld[12], however, states: "In spite of the fact that inoculations on the human subject have not been made we must consider the streptococci as certainly having the power of producing a conjunctivitis in many persons." Further study of the subject is therefore justified.

This study of streptococcal inflammations was undertaken in order to determine the incidence and nature of the infections. In a series of 520 cases of ocular inflammation in which the causative organism was determined, streptococci were cultured from 18 cases, an incidence of 3.46 percent. The differentiation* of Streptococcus viridans from Diplococcus pneumoniae was based upon the characteristic differences of colony formation, inulin fermentation, and bile solubility.

Conjunctivitis (7 cases)

Streptococci were recovered from the conjunctiva in 7 of a series of 448 cases of conjunctivitis from all causes. Streptococcus hemolyticus was found in pure culture three times and Streptococcus viridans once; either Streptococcus hemolyticus or viridans, in combination with Staphylococcus aureus or albus, Corynebacterium xerosis, or oth-

*The differentiation of Streptococcus viridans from pneumococci is not always satisfactory. Avirulent pneumococci occasionally are not bile soluble.

er nonpathogenic organisms, was found in the remaining three cases.

Primary conjunctivitis (1 case)

A mild bilateral chronic conjunctivitis of 4 weeks' duration was encountered in an elderly man. Streptococcus viridans and Staphylococcus aureus were grown in cultures from the right eye and Streptococcus viridans alone from the left eye. The pathogenicity of the streptococcus was not determined.

Secondary conjunctivitis complicating skin disease (5 cases)

Conjunctivitis—secondary to arsphenamine dermatitis (1 case). An acute bilateral conjunctivitis occurred as a complication of exfoliative dermatitis resulting from antisyphilitic arsphenamine therapy. Conjunctival cultures grew Streptococcus hemolyticus and Staphylococcus aureus.

Conjunctivitis—secondary to contagious impetigo (1 case). Acute conjunctivitis appeared in a case of contagious impetigo in a young adult who had exfoliative dermatitis since infancy. Streptococcus hemolyticus was cultured from the conjunctiva. The inflammation improved under treatment but did not completely subside until the impetigo had disappeared.

Conjunctivitis—secondary to an erysipelaslike inflammation of the face (1 case). A woman had an acute mastoiditis from which Streptococcus viridans was cultured; after operation there developed an erysipelaslike inflammation of the wound and face. The inflammation subsided but septicemia developed and the conjunctiva became acutely inflamed. Streptococcus viridans was cultured from both the conjunctiva and the blood.

Pseudomembranous conjunctivitis—occurring after a skin eruption of unknown etiology (1 case).* Chronic pseudomembranous conjunctivitis of the left eye with involvement of the entire cornea was observed in a girl, aged 6 years. The conjunctivitis followed an acute pharyngitis and a skin eruption described as "small red places on the back and arms." The condition did not respond to treatment and after a few months the eye was enucleated. Later the conjunctiva of the right eye was attacked, and there developed a pseudomembranous vaginitis and acute glomerular nephritis. Streptococcus hemolyticus was present on the conjunctiva and in the vagina for a few weeks after each exacerbation. The lesions of the right eye and vagina responded to treatment with scarlet-fever streptococcal antitoxin and healed after immunization with autogenous vaccine and scarlet-fever streptococcal toxin, but a granuloma with attached pseudomembranes persisted in the socket in spite of all efforts to remove it.

Keratoconjunctivitis—complicating erysipelas of the leg (1 case). A young man had 15 recurrent attacks of erysipelas of the right leg, each attack being accompanied by an acute keratoconjunctivitis of the left eye. A superficial corneal ulcer, 1.5 mm. in diameter, was present in the pupillary area and there were several smaller ulcers in the periphery. Superficial vascularized scars, evidently the result of previous attacks, were also present. Conjunctival cultures grew only Streptococcus hemolyticus. An autogenous vaccine (750 million cocci per c.c.) was administered intradermally, every other day, in graded doses, beginning with 0.05 c.c. and ending with 1.00 c.c. at the 16th dose. The Dick test was positive, and in rabbits stock scarlet-fever streptococcal antitoxin neutralized the toxin prepared from the conjunctival streptococci in accordance with the methods advised by Veldee[13]. The patient was therefore immunized against scarlet-fever streptococcal toxin with 18 graded intramuscular injections which were given every fifth day; the first injection consisted of 12 S.T.D. (skin test doses) and the last of 80,000 S.T.D. After the initial doses there were several occasions during which the right eye became hyperemic and the left groin painful, but the corneal ulcer did not recur.

* A detailed report of this case was presented before the Association for Research in Ophthalmology at Atlantic City in June, 1935.

Final courses of autogenous vaccine and scarlet-fever streptococcal toxin were administered and the patient was advised to return in one year for further immunization. However, 9 months after the last autogenous vaccine was given the patient had an attack of erythema of the left leg of four days' duration complicated by a mild keratoconjunctivitis of the left eye which responded to ordinary treatment and healed within a period of one week. Since immunization apparently persisted for only a short time it necessitated a series of injections of autogenous vaccine every 3 months.

Secondary conjunctivitis superimposed on an old inactive trachoma (1 case). Conjunctival cultures from an old inactive trachoma with secondary infection grew Streptococcus hemolyticus, Staphylococcus albus and Corynebacterium xerosis.

Dacryocystitis (4 cases)

Streptococci were recovered from the lacrimal sac in 4 of a series of 33 cases of chronic dacryocystitis. Streptococcus hemolyticus in pure culture was present in 2 cases and Streptococcus hemolyticus, Staphylococcus albus, and Corynebacterium xerosis were present in a third. In the remaining case Streptococcus viridans in pure culture was recovered from both the lacrimal sac and the orbital abscess which developed by extension following dacryocystectomy.

Orbital Abscess (2 cases)

Two cases of streptococcal orbital abscess were observed in a series of 5 cases in which the infection was the result of extension from a paranasal sinusitis. One of the abscesses followed irrigation of an infected maxillary sinus and was caused by Streptococcus nonhemolyticus. The other occurred in conjunction with a chronic suppurative pansinusitis and was due to Streptococcus hemolyticus.

Inflammation of the Eyelid (2 cases)

Cellulitis—primary infection (1 case). Cellulitis of the left lower eyelid was observed in a young woman. There was no history of injury. The inflammation had appeared suddenly in the lower lid and had spread rapidly to the upper lid and side of the face. After the third day the inflammation gradually subsided until only the lower lid remained involved. An incision was made through the skin and Streptococcus hemolyticus was recovered in pure culture.

Fistula in upper eyelid—complicating chronic suppurative frontal sinusitis (1 case). Streptococcus hemolyticus and a nonpathogenic corynebacterium were cultured from a discharging fistula in the upper eyelid which had formed as a result of chronic suppurative frontal sinusitis with osteomyelitis. The fistula healed after a radical external frontal-sinus operation.

Infected Wound (2 cases)

Streptococci were recovered from two cases of infected wounds. One case followed excision of an epithelioma of the lid; Streptococcus viridans and Staphylococcus aureus were grown on culture. The other was an infection with Streptococcus hemolyticus of an old granulating skin wound near the external canthus.

Discussion

Streptococcus hemolyticus (beta) was found in pure culture in seven cases, Streptococcus hemolyticus (alpha), otherwise known as Streptococcus viridans, in two cases, Streptococcus nonhemolyticus in one case, and either Streptococcus hemolyticus or viridans with other bacteria in six cases. The infections occurred, in order of frequency, as follows: conjunctiva, lacrimal sac, orbit, eyelid, cornea, and globe. Five cases of conjunctivitis occurred in conjunction with some skin disease, four being due to streptococci and the remaining one, in which Staphylococcus aureus was also found, following an arsphenamine dermatitis. Streptococci were recovered in two other cases of conjunctivitis and may or may not have been the etiologic agent; one was a primary conjunctivitis, the other a mixed secondary infection superimposed on an old trachoma. In all of the cases with

dacryocystitis there was a chronic lacrimal conjunctivitis. The cases of orbital abscess and fistula in the upper eyelid complicated infections of the paranasal sinuses; the case of panophthalmitis followed spontaneous rupture of the globe. All of the inflammations occurred in conjunction with some other pathological condition except the primary conjunctivitis and the cellulitis of the lower lid.

The pathogenicity of Streptococcus hemolyticus is variable and the presence of the organism in an inflammatory process can not be taken as evidence that it is the etiologic agent until its pathogenicity has been proved. Hare[14] found that two to three percent of women at time of labor and five to six percent during the lying-in period had Streptococcus hemolyticus in the vagina but did not have puerperal sepsis. These strains were easily killed by normal human blood but strains from puerperal sepsis were able to multiply.

The pathogenicity of the streptococcus recovered from the pseudomembranous conjunctivitis could not be proved until a thorough study had been made of its toxins and their neutralization with scarlet-fever streptococcal antitoxin. The favorable results obtained in this case with scarlet-fever streptococcal antitoxin depended upon the similarity of the exotoxin produced by the causative organism and that produced by the stock scarlet-fever streptococcus used in the preparation of antitoxin. This similarity may have been accidental. However, Williams[15] believes that a strong exotoxin from many strains will produce an antitoxin which will neutralize the exotoxin of most strains in most people.

Immunization against hemolytic streptococci was difficult and both exotoxins and endotoxins were required. Exacerbations in conjunction with intercurrent infections in the case of pseudomembranous conjunctivitis were not prevented by injections of autogenous vaccine (endotoxins) but after the patient had also been immunized against scarlet-fever streptococcal toxin (exotoxins) these exacerbations no longer occurred. Even after extensive courses of injections of both types of toxins, the period of immunization apparently was short, since a mild exacerbation occurred in the case of keratoconjunctivitis nine months after the last injection of autogenous vaccine was given.

The pathogenicity of Streptococcus viridans is also variable. It might appear that the case of primary conjunctivitis was caused by Streptococcus viridans but an exhaustive study was not made and the organism may have been nonpathogenic and present on the conjunctiva as a mere contamination from the nose and throat, where it is almost always present[16]. There was no question as to the pathogenicity of Streptococcus viridans in the case of conjunctivitis secondary to an erysipelaslike inflammation of the face complicated with septicemia, or in the case of dacryocystitis with orbital abscess which developed by extension following dacryocystectomy. The streptococci were recovered in pure culture from both conjunctiva and blood stream in the first instance and from both lacrimal sac and orbital abscess in the second.

A parallelism[8, 10] has been drawn between streptococci and Corynebacterium xerosis. Both organisms may be found on the normal conjunctiva but Corynebacterium xerosis is much more frequently seen. Routine bacteriological examination of 347 cataract patients showed Corynebacterium xerosis in 186 cases, Streptococcus viridans in 3 cases, and Streptococcus hemolyticus once. Corynebacterium xerosis is nonpathogenic for man and animals; it has not been shown capable of producing an inflammation of any mucous membrane. The pathogenicity of certain strains of streptococci and their ability to produce inflammation of the nasal and pharyngeal mucosa are certain. It seems unjustified to draw a parallellism between these two organisms even in those instances in which the streptococci appear on normal conjunctiva.

The streptococcus is not an epithelial parasite*; it was never found on epithelial cells in preparations of conjunc-

* The concept concerning epithelial parasites was introduced by Lindner[9] and confirmed by Howard[11].

tival scrapings. The presence of the organism in the conjunctival sac definitely corresponded to the presence of corneal ulcers in the case of keratoconjunctivitis. When the ulcers healed the organism promptly disappeared. The source of the organism in the conjunctival sac must have been subepithelial. A similar conclusion was reached in the case of pseudomembranous conjunctivitis in which the streptococci reappeared in the conjunctival sac after long periods of absence. These reappearances occurred in conjunction with intercurrent infections which lowered the general resistance of the patient. The constant presence of the organism subconjunctivally offered the only explanation for the recurrences, and if it were constantly present subconjunctivally, then the condition was really a subconjunctivitis.

It is extremely difficult to prove the problem by demonstration of the organism in the tissues. Countless colonies of the organism were cultured from the conjunctival sac in the case of panophthalmitis but only occasional chains were demonstrated in sections of the necrotic cornea (fig. 1). The case of pseudomembranous conjunctivitis showed chains in sections of pseudomembrane only during periods when the cocci could be cultured from the conjunctival sac. The enucleated eye showed no demonstrable organisms either in chains or as diplococci, but two months after enucleation they reappeared in the conjunctiva during an exacerbation accompanying an attack of mumps. The absence of demonstrable organisms in chains or as diplococci does not prove that a few single cocci were not present. The ability of streptococci to remain dormant in living tissues for long periods of time is well known.

Axenfeld[17] stated that in metastatic gonorrheal ophthalmia "the organisms lie in the tissues and vessel walls of the conjunctiva and may cause an inflammation of the mucous membrane without themselves occurring on the surface." In rare instances the gonococci may appear on the conjunctiva. The condition is therefore a subconjunctivitis and is similar to that produced by streptococci except that the latter more readily appear on the surface.

The remaining cases of streptococcal conjunctivitis were not subconjunctival. Since streptococci are not epithelial parasites it follows that under certain conditions they are able to grow in the secretion in the conjunctival sac and produce a conjunctivitis by the action of exotoxins.

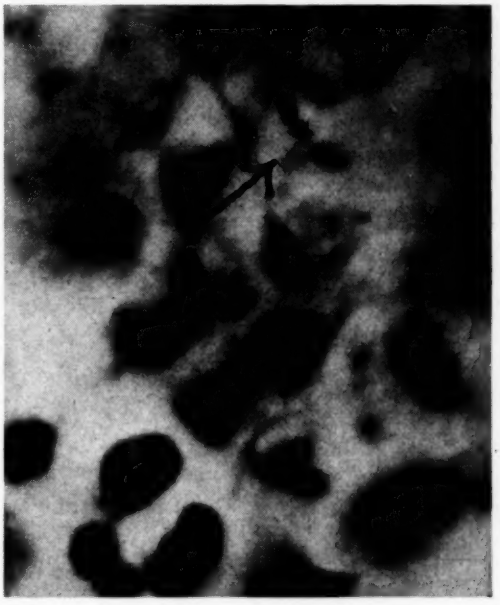

Fig. 1 (Kluever). Streptococci in the cornea in case of panophthalmitis.

Conclusions

1. The incidence of streptococci in inflammations of the eye and adnexa was 3.46 percent, i.e., in 18 of 520 cases.
2. Streptococcus hemolyticus was found in pure culture seven times, Streptococcus viridans twice, and Streptococcus nonhemolyticus once.
3. The locations of the infections in the order of frequency were conjunctiva, lacrimal sac, orbit, eyelids, cornea, and globe.
4. All of the infections occurred in conjunction with some other pathological condition with the exception of one case of cellulitis of the lid and one of conjunctivitis in which the streptococcus may have been a contamination.

5. Three distinct types of streptococcal conjunctivitis were observed: lacrimal, pseudomembranous, and acute conjunctivitis in conjunction with some skin disease.

6. The streptococcus is not an epithelial parasite. It apparently was present in the subepithelial tissues in two cases of conjunctivitis and in remaining cases it grew in the conjunctival secretions and produced the inflammation through the action of exotoxins.

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ETIOLOGIC SIGNIFICANCE OF THE ELEMENTARY BODY IN TRACHOMA

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Epithelial scrapings from the trachomatous eyes of Indian children were found to contain Prowazek-Halberstaedter bodies. A preparation made from them was filtered through a collodion membrane. Part of the filtrate was cultured, part centrifuged, and part instilled into the conjunctival sac of a normal human eye. The culture media yielded no growth; the sediment after centrifugalization contained elementary bodies; and the eye of the human volunteer after five days' incubation developed an acute inflammation which after six weeks was diagnosed as trachoma, the cornea showing characteristic changes. Elementary bodies were recovered from the conjunctival smears. From the Department of Ophthalmology, College of Medicine, State University of Iowa. Aided by a grant from the Committee on Scientific Research, American Medical Association.

The active agent of trachoma has in general been retained by ordinary bacterial filters[1]. The experiments of Nicolle, Cuénod, and Blaizot[2]* (1912, confirmed by those of Thygeson and Proctor[5] (1935), indicate, however, that active bacteria-free filtrates are obtainable with filters designed so as to reduce adsorption losses. Nicolle and his coworkers used a filter of small filtration area made by cementing a button of Berkefeld V substance into a glass tube. Thygeson and Proctor used graded collodion membranes (Elford[6]) with average pore diameter of 0.75 microns. In four experiments on baboons they confirmed the original observations of Nicolle, Cuénod, and Blaizot as to the virus nature of the etiologic agent of trachoma.

The failure usually to obtain active filtrates with kieselguhr or porcelain filters suggests that the particle size of trachoma virus may be within the range of microscopic vision. In 1907 Halberstaedter and Prowazek[7] reported the presence in trachoma of minute coccus-like bodies, the elementary bodies, both free in the secretion and massed together in the cytoplasm of conjunctival epithelial cells to form the so-called Halberstaedter-Prowazek inclusion bodies. The size of the elementary bodies (0.25 micron when stained with Giemsa) is consistent with filterability. They resemble closely the elementary bodies of inclusion conjunctivitis and psittacosis in size and staining reactions, but stain more readily with Giemsa and other dyes than do the elementary bodies of vaccinia-variola, fowl-pox, and molluscum contagiosum, which they resemble in other respects. They have been found in trachoma throughout the world and are the only formed elements** demonstrable in a sufficient proportion of cases to indicate etiologic significance. The claims of Halberstaedter and Prowazek have been accepted by Axenfeld[8], Lindner[9], Taborisky[10], Howard[11], and others, although no conclusive experimental evidence has been offered in their support.

In an effort to test the identity of the elementary body and trachoma virus, the following experiment was performed:

Material. On April 2, 1935, epithelial scrapings were taken from both eyes

* Bertarelli, E., and Cechetto, E.,[3] and Marongiu, L.[4] reported positive filtrations prior to those of Nicolle, Cuénod, and Blaizot, but their experiments appear to have been insufficiently controlled.

** The significance of the Rickettsialike bodies found by Busacca[12] has not yet been determined. They may be identical with the elementary and initial bodies (Lindner) of trachoma.

of ten Indian children *** with trachoma IIa-III. The material was shown by microscopic examination to contain Halberstaedter-Prowazek inclusion bodies and to have no gross bacterial contamination.

Preparation. The removed material was suspended in 5 c.c. of sterile nutrient broth (pH 7.3), ground thoroughly in a mortar for five minutes, and passed through hard filter paper to remove cellular debris.

Filter. An Elford graded collodion membrane, 0.14 mm. thick with 0.6 micron average pore diameter, was mounted in a Jenkins filter, modified for collodion discs. The filtration area was 0.64 sq. cm.

Filter test. Discs from the same membrane sheet passed elementary bodies of molluscum contagiosum but retained Bacterium granulosis (FD4 and T13 strains) and H. influenzae.

Filtration. The filter was sterilized by steaming for one hour. Filtration time was less than five minutes, with negative pressure of less than 30 cm. Hg.

The filtrate was divided into three equal parts.

Filtrate culture. One third of the filtrate was used for inoculation of blood-agar slants and semisolid leptospira medium. There was no growth.

Filtrate sediment. One third of the filtrate was centrifuged. Moderate numbers of elementary bodies were seen in the sediment.

Subject. C. B., male, aged 50 years. Normal right eye and conjunctiva. Left eyelids and eye had been lost from epidermoid carcinoma.

Inoculation. One third of the filtrate, approximately 1.6 c.c., was instilled into the conjunctival sac of the right eye after preliminary light scarification with a platinum spatula. The conjunctiva was rubbed lightly with a cotton applicator.

Result. After an incubation period of exactly 5 days, an acute inflammation developed. Smears and cultures revealed only C. xerosis. Halberstaedter-Prowazek inclusion bodies and free elementary bodies were present in large numbers. The diagnosis of trachoma was established at six weeks by the presence of the infiltrative and vascular changes in the cornea which are typical of trachomatous pannus. The conjunctival changes and clinical course**** have been characteristic of trachoma. There has been no secondary bacterial infection.

The experiment confirms the virus nature of the etiologic agent of trachoma, and offers evidence to support the view that trachoma virus and the trachoma elementary body (Halberstaedter-Prowazek) are identical. This evidence may be summarized as follows: (1) Elementary bodies were demonstrated in the infective material; (2) elementary bodies were seen in the centrifuged filtrate; (3) elementary bodies were present in large numbers in the experimentally produced disease; and (4) no other formed elements of possible etiologic significance were cultivated from, or demonstrated microscopically in, the induced disease.

We wish to express our sincere appreciation to Mr. Clarence Brown of Iowa City who volunteered for the experiment and, although in poor health, made the journey to Fort Apache.

*** The experiment was performed at Fort Apache, Arizona. The trachoma cases were from Fort Apache Indian School. We are indebted to the Indian Service and to the employees of the White River Agency for their cooperation in this study.

**** Drs. C. S. O'Brien and P. J. Leinfelder confirmed our diagnosis.

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TENDON TRANSPLANTATION IN OCULAR-MUSCLE PARALYSIS

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This paper emphasizes the need to have cases of ocular-muscle paralyses under the observation, from their onset, of an ophthalmologist who is able to handle them surgically, in order that operation may be done as soon as it becomes certain that the paralysis is permanent and before contractures have developed in the opponents. It also disproves the contention of some authorities (Bielschowsky) that transplantations are not worth while because of a mistaken idea that binocular action is never secured. Binocular vision is secured, at least in positions near the primary, in all cases that have come to operation before contractures have occurred. It summarizes the author's personal experience with the four types of transplantation methods, three of which are original. Read before the Western Ophthalmological Society, at Butte, Montana, July 19, 1934.

The statements to be made in this paper are based on an experience of about thirty operations; consequently, they are not mere theoretic opinions.

The first question is "Who should decide when to operate?" The answer, of course, is self-evident and yet, in a recent meeting, a neurologic surgeon stated that he never referred such patients to an ophthalmologist until a year had elapsed from the onset of the palsy. Of course, he thought he was giving his patients every chance to get well without operation but overlooked the fact that he is virtually deciding the conduct of a condition entirely out of his line and is reducing the prospect of a good result. This fact will be made even more plain when we come to consider the subject of contractures.

The internist, as well as the general and neurologic surgeon, should be interested in this subject because paralysis of ocular muscles is due to some general disease or head injury and is first seen by one or the other. The pediatrician also sees these cases as congenital defects. The oto-laryngologist sees abducens palsy as part of the Gradenigo syndrome and palsy of other muscles as complications of orbital infections. This means that practically all doctors should be informed that relief is possible in spite of statements to the contrary still to be found in some textbooks—even those on ophthalmology.

Therefore cases of ocular-muscle palsy should *not* be dismissed as incurable but *should be referred at once to an ophthalmologist who is able to handle them surgically*, for continued observation, in order that operation may be done as soon as it is certain that the paralysis is permanent.

Operation should be done before contractures start in the opponents because it may then be possible to avoid extensive tenotomies and so obtain a better functional as well as cosmetic result.

Usually a paralysis, when it is going to recover, shows early improvement and a fairly rapid progress toward its final position. If it is *complete* at the *end of three months*, in spite of proper treatment, the prospect of cure is too slight to warrant much more delay. In cases of partial paralysis operation should be delayed till it is certain that progress toward cure has ceased.

It is probable that, in these cases, better results might be obtained by some form of transplantation with shortening of the affected muscle (omitting tenotomy of the opponent) than by the usual advancement with tenotomy, the action of which is, in itself, to produce a partial paresis.

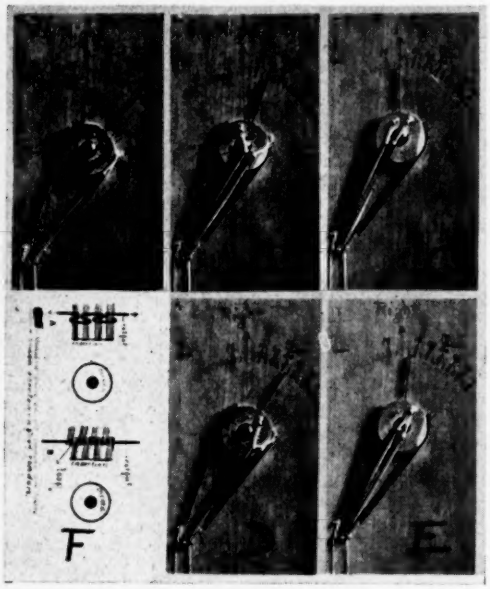

Fig. 1 (O'Connor). The mechanical tendencies of the various transplantations shown in Figure 4.

Congenital cases should be operated on as soon as possible (third year) in order that every opportunity may be given to learn the use of the eyes as a pair.

The fact that binocular vision has been preserved in many of the reported cases proves that muscle action is guided by the fusion sense irrespective of the muscle innervation used to secure the necessary movement.

It is well known that the vertical recti aid in lateral rotations. Their angle of action is such that they can aid inward rotation at all times and outward in positions beyond 27 degrees. It is fair, therefore, to assume that they are furnished the necessary conjugate innervations. If this is so when the good eye turns in 27 degrees, the vertical recti of the other eye should receive conjugate innervation to aid its outward rotation. Transplantation of the vertical recti outward and downward increases their outward leverage markedly, so that they may aid in outward rotation before the 27-degree position is reached. My three new methods still further increase this leverage because the entire tendon is displaced external in varying amounts to the median vertical plane of the eye, which, I think, accounts for my greatly improved results. (Figure 1 shows the mechanical tendencies of all types of transplantations.)

It is important that we agree on what constitutes a complete paralysis. It is my understanding that complete relaxation of an *uncontracted* internus will permit the eye to swing out to within 10-15 degrees of the primary position. When, under this condition, the eye is able to reach the primary position the paralysis is not complete and much better results can be hoped for. A recent writer, in reporting *one operation*, argues that the paralysis is not complete (in abducens palsy) if the eye can move out at all when the good eye turns in. He must have had a case with marked contracture of the internus. He also argues that cases of good outward rotation reported by others could not have been in complete palsies and quotes Woodruff's belief that a real transplantation of action does not occur because the tendon, where split, forms an adhesion to the sclera. He thinks that any good results are due solely to the shortening with tenotomy of the opponent. He must have overlooked my paper at the Colorado Congress of 1921. Several successful cases of transplantation without shortening of the affected muscle and without tenotomy of its opponent there reported prove, to me at least, that the good results were due solely to the transplantation. All of this still further proves that, to obtain the best results, we must operate before contractures in the opponents have started. Which brings us to a detailed consideration of that subject.

Contractures

It is worth while to go into detail concerning this condition, which devel-

ops in the opponents of the palsied muscle.

Let us assume a case of complete abducens palsy that has reached its final position because of such contractures. The physiologic opponents are the internus and the two vertical recti. In figure 2 will be seen, in a diagrammatic way, the position such an eye may finally assume—at, for instance 45 degrees of arc convergent squint. We know that the contraction of a rectus is about one millimeter for each five degrees of arc rotation. Therefore, in this case, the internal rectus becomes permanently shortened about nine millimeters, which is an insuperable obstacle to any transplantation and definitely calls for relaxation of some sort. But when this is done the functions of convergence and inward rotation are ruined. Hence the importance of operating before this condition has developed. These statements are not theo-

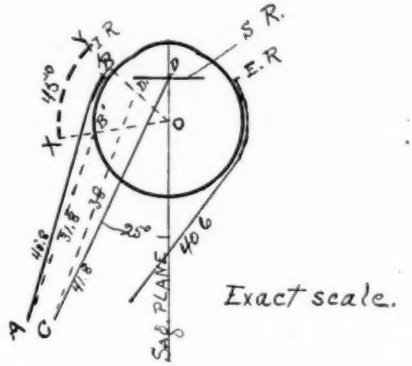

Fig. 2 (O'Connor). To show contractures of the internus and vertical recti. AB and CD = conditions in primary position. AB′ and CD′ = conditions in 45-degree inward rotation. Internus shortened 9 mm. Each vertical rectus shortened 3 mm.

retical. I know from bitter experience, whereas the opposite experience is proportionately pleasant.

Concerning the vertical recti as opponents: in figure 2, which is drawn to scale, the shortening of the vertical recti, in the 45-degree position, is about 3 mm. as compared with the primary position and, of course, they finally become contracted that amount. In my last patient (figure 3) it was difficult to move the eye either up or down even with the hook under the tendon. It is probable that two muscles, each contracted 3 mm., offer about as much obstruction as one contracted 9 mm.

Can anything be done to prevent the occurrence of these contractures? Many years ago when doing general work in the Army I used to exercise, electrically, the facial muscles in cases of 7th-nerve palsy. In this way they

Fig. 3 (O'Connor). To show the lack of outward relaxation due to contraction of the left internus.

were kept in condition while the causal lesion was recovering. I see no reason why the externus could not be similarly exercised. I have never had an opportunity to try it because all my cases have been "finished" before coming under my care.

Therefore it cannot be emphasized too strongly how important it is to have these cases under the observation of an ophthalmologist who has prepared himself to do the necessary operation from the onset of the paralysis.

Types of operations

1. The operation first proposed by Hummelscheim, and the one usually done, is a simple transplantation of the outer halves of the vertical recti to the corresponding margins of the external rectus. In applying the principle to other muscles the halves nearer to the palsied muscle are used.

2. My first modification of this procedure (figure 4, method 1) utilized a slip from each margin of the externus, which, when sutured to the transplant, was intended to lessen the tension. Dr. L. C. Peter immediately adopted this scheme and reported several operations. It will be found figured in his book. Eight operations were done according to this idea and were reported in 1921 before the Colorado Congress. The paper appeared in the November,

1921 number of the American Journal of Ophthalmology.

3. My next original idea consisted in transplanting the vertical recti *in toto*. Six operations were done according to this method, the first being reported as an appendix to the above-named paper. Vertical deviations were produced in several probably through unequal tension, which led me to devise the next method which, I believe, solves the problem in so far as this is possible.

Fig. 4 (O'Connor). Illustrating methods of procedure.

4. Transplantation of the halves farther from the palsied muscle. This, in the case of abducens palsy, means using the inner halves of the vertical recti. Nine operations have been done by this method and the results are definitely superior, so that now I feel fairly certain of good results provided there are no contractures.

5. Another scheme, which I believe is also original, consists in laying one half of the tendon over the other half. For example, in a definite abducens paresis, the inner halves of the vertical recti are laid over the outer halves and held by mattress sutures. It is especially useful in these conditions as an aid to a cinch shortening of the affected muscle and avoids a tenotomy of its opponent.

6. Transplantation of the inner two thirds of the vertical recti. If contractures of the opponent are present, I now prefer to perform a central tenotomy as a preliminary procedure. About six weeks later the transplantation is carried out and, if necessary, the marginal cuts may be made, thus accomplishing the regular two-stage tenotomy. This method of transplantation is so positive, relatively, that if the internus is completely cut at the time of transplantation, its functions will be markedly impaired.

Technique of the transplantation itself. 1. Expose the externus as for a cinch shortening through a straight vertical incision, about 10 mm. long, over the tendon.

2. Similarly expose the superior rectus. (a) With the sharp hook split it as far back as possible at the junction of the middle and outer thirds. (b) Free its inner margin as far back as possible. (c) Place a single over-cinch loop, as close as possible to the insertion (figure 5), in the inner two thirds using a single strand of 0000 20-day gut. (d) Shave this portion close to the sclera in order to keep on the transplant the dense fibrous area of the insertion. This prevents the pulling out of the cinch loop (figure 5B). (e) Insert the eyed hook from the upper margin of the externus, passing it behind the attachment of Tenon's capsule to the sclera and the outer third of the superior rectus (figure 5C). (f) Thread the two ends of the cinch loop through the eye and withdraw, which takes them over to the externus.

3. Treat the inferior rectus in the same way.

4. With the two ends from the superior make a cinch shortening of the upper half of the externus and with the two ends from the inferior rectus similarly shorten its lower half (figure 5D). The single or double over-loop may be used as desired, the single over probably is best as it is merely useful as an anchorage. Sliding these through brings the transplant into its new place at the margin of the externus. At this place it is worth emphasizing that the change in position of the transplant is a *lateral one* and not forward, hence there is very little tension.

5. When both transplants are in contact with their respective margins of

the externus, the four ends of the shorteners are tied together (figure 5D).

6. All incisions are closed with a continuous suture which leaves no knots.

7. The unoperated-on eye is left open and in use. I feel that my cinch loop cannot cut out or pull through. Consequently when the good eye moves, the one operated on will also. It is my idea that this motion, combined with the fact that the transplant lies on smooth sclera, may prevent the formation of adhesions except where it makes contact with the externus. In that event the transplant will act from that point and not somewhere far back on the sclera. In one of my cases of total transplantation that called for a second operation because of a vertical deviation, there were no adhesions behind that point; so possibly my idea is correct. However, if any ordinary advancement does not adhere back of the normal insertion, I see no reason why a transplant, treated in the same way, should do so.

This operation, mechanically and physiologically, is far superior to transplantation of the outer halves because: (1) All of the new attachment is far external to the median vertical plane of the eye. This, of course, mechanically favors outward rotation. (2) The transplants, if properly isolated far back, fall into their new places without tension. (3) There is no opponent action by the outer portions as with the older method. When the outer halves are transplanted the inner act not only as mechanical obstacles but also as physiologic opponents. Moreover, it is entirely possible that, as Woodruff claims, the point at which the tendon-split ends may adhere to the sclera and spoil the whole result by making that point actually the new insertion.

Total transplantation is done exactly as described above except that the whole tendon is transplanted.

Transplantation of one half over the other needs no description. The half moved is simply applied over the other and held by a mattress suture.

It will be noted that the outward displacement of the new action is greater with the total method and less with the overlap but that in all three the new action is external to the median vertical plane of the eye.

Personal experiences

These may be recorded under the following headings:

A. Of the nearer halves of the transplanted tendons.

1. One case of complete gunshot paralysis of the superior rectus in

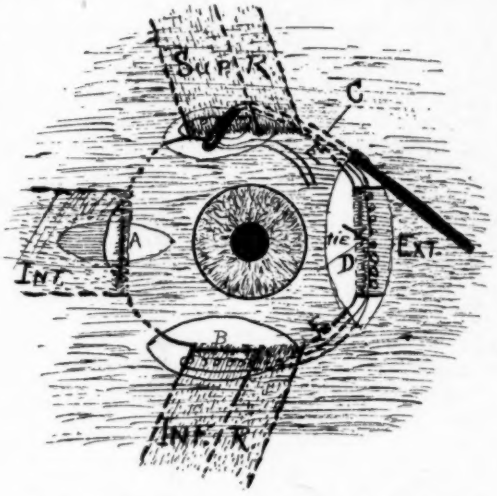

Fig. 5 (O'Connor). The technique diagrammatically of transplantation of halves farther from the muscle to be helped. A. Central tenotomy of opponent. B. Transplant separation with cinch loop suture in place. C. Eyed hook passed behind ring of capsular attachment and the untransplanted portion of tendon threaded with the two ends of cinch suture. D. Single over cinch loop in each half of paralyzed muscle tied over its center after pulling transplants into contact with corresponding margins of the paralyzed muscle. Note that each tendon is exposed by a small incision instead of the usual large concentric one.

which the upper halves of the horizontal recti were used (figure 4, method 4). A success—15 degrees of upward rotation being secured without touching the inferior rectus.

2. Seven cases of abducens palsy. (a) Four were complete, one of which resulted only in cosmetic improvement. Three resulted in outward rotation of 35, 15, and 30 degrees. (b) Three were incomplete. Two were successes cosmetically and rotationally. The other was a total failure, partly because the behavior of the patient made impossible

the proper performance of the operation itself. In one case an outward rotation of 5 degrees improved to 20 by the 16th day when the patient, who was a sailor, had to rejoin his boat. The other gained from 20 to 40 degrees. In the case of the sailor the internus was not touched. My first case was reported in the American Journal of Ophthalmology for March, 1919, and the other seven in the same journal for November, 1921.

B. Total transplantations of the vertical recti for abducens palsy. Six operations of which one was a re-operation of my first case of outer-half transplantation. Four were complete. My first was incomplete, the eye being able to rotate out to the primary position. Again, to prove that the transplantation alone was the cause of any improvement, the internus was not touched nor was the externus shortened. Outward rotation improved to 30 degrees. The sixth case was similar but a marked vertical deviation resulted which required a second operation with a final outward rotation of 20 degrees. This occurrence caused me to give the method up in favor of the inner-half method. Of the four complete cases, one patient secured 15, another 5 degrees of outward rotation with binocular vision. In neither was the internus touched. A third had outward motion of 5 degrees when the internus was cut. This was a mistake because, although increasing outward motion to 25 degrees, it lessened inward motion and produced an insufficiency of convergence. The fourth passed out of observation before the final result was known, but outward motion was increasing.

C. Transplantation of halves farther from the paralyzed muscle.

1. Overlapping this half over the other and holding in place with a mattress suture. This has been done a number of times but I could find a detailed account of but one. The palsy was incomplete, as the eye could be rotated out to the primary position. The externus was shortened by my cinch method but the internus was not touched. Outward motion increased to 15 degrees with no diplopia in the primary position. This operation could have been used in all the other incomplete cases, probably with better results and with less discomfort to the patient and operator, for it is very easy.

2. Of the inner two thirds of the vertical recti for abducens palsy; seven operations. In my first operation by this method the internus was found extremely rigid and was cut, which was a mistake, as inward rotation was markedly impaired. This caused me to decide to use the two-stage tenotomy with the first stage done as a preliminary operation six weeks before the transplant; this, of course, only in those cases in which there are contractures. In the other eye of the same patient there was not a complete paralysis and the internus was not touched. The third operation was on a patient who had not a complete case, as the eye could be rotated out to the primary position. Only a central tenotomy of the internus was done. Final outward rotation was 40 degrees. Fourth operation was for a complete case, and the procedure was the same as in the third. It was performed at The Los Angeles Hospital before the 1931 meeting of the Pacific Coast Oto-Ophthalmological Society. The patient was not seen by me after operation but the interne in charge reported an outward rotation of 55 degrees. This probably is an error but the result must have been good.

The next patient was another with bilateral congenital abducens palsy. The interni were extremely large and rigid. In this one I played safe and sacrificed outward rotation rather than risk interference with the near use of the eyes. Only about 5 degrees of outward rotation was secured in each eye but the parents were well satisfied. Much better results probably could have been secured had the child been operated on at the age of 3 years instead of 9. This case still further impressed me with the need to do the work on the internus as a preliminary operation when contractures are present.

The seventh operation was due to skull fracture over a year prior to operation. There were marked contractures in the internus and also in the vertical recti. The eye was set in

marked convergence as shown in figure 3 in which the right eye (normal) is looking as far to the left as possible. A central tenotomy of the internus was done five weeks before the transplant and at that time the marginal cuts were made.

This operation is as easy as the total, gives just as good outward motion, and is much safer in that the uncut portions serve as "lines of retreat" in case something should go wrong.

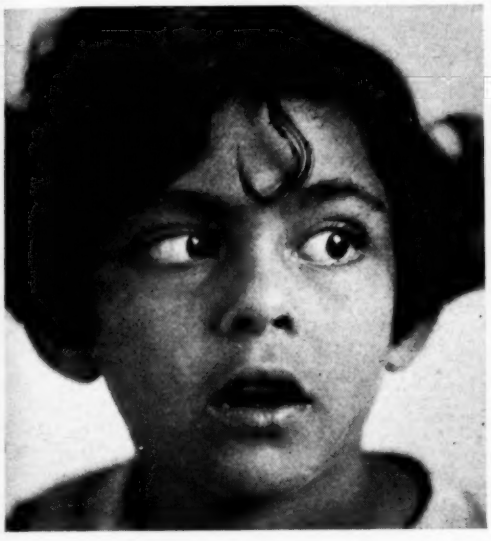

Fig. 6 (O'Connor). Shows extent of outward motion after transplantation for congenital abducens palsy.

3. Three patients with paralysis of the superior rectus in which the lower halves of the horizontal recti were used. In two the results were satisfactory. The third had multiple congenital malformations of the muscles themselves, which made a good result practically impossible. There was, however, some improvement.

4. One case of isolated paralysis of an internus with a divergence ad maximum. The internus was shortened to the limit, the externus fully cut, and the outer halves of the vertical recti were transplanted. Dr. Schuster of El Paso, for whom I operated, reported that an inward rotation of 15 degrees was secured, which was a horizontal gain of more than 30 degrees.

This paper and its statistics were to date of the spring of 1932. Since then I have performed six more operations. There is no need to describe them in detail as they simply reinforce the statements made in this paper. It is worth while to mention one patient in whom the interni were muscle tissue practically including the full extent of the expansions. In this operation both interni were cut subcapsularly as preliminary procedures because of the uselessness of transplanting against such

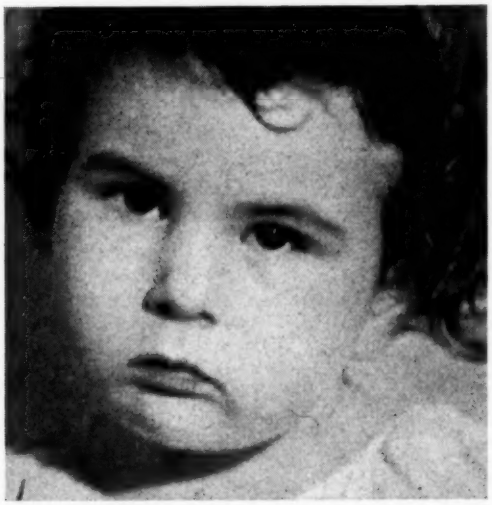

Fig. 7 (O'Connor). Result after bilateral transplantations for double congenital abducens palsy. This case was identical with the fifth one listed under heading "Transplantation of halves farther from paralyzed muscle." Both eyes converged markedly before operation so that vision to the right was with the left eye and to the left with the right eye.

powerful opposition. At this writing the cosmetic result is excellent and I am awaiting final results before transplanting.

Summary

1. An ophthalmic surgeon who is able to perform the necessary operation should be permitted to decide when and how to operate. In order that he may be free to do this every patient should be under his observation from the onset of the palsy.

2. Complete palsies should be brought to operation as soon as it is certain that they are permanent. Children with congenital palsies should be

operated on in the third year of life, in the interests of binocular vision.

3. In order to avoid disabling tenotomies, the operation must be done before the onset of contractures in the opponents.

4. The writer naturally feels that the operation of choice is his new one by which the tendon halves farther from the palsied muscle are used. In case of an abducens palsy the nasal halves of the vertical recti are transplanted. The cinch loop of course must be used for secure anchorage in the transplants.

5. General results in a series of operations by different methods are given.

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CHANGES OF THE REFRACTION IN CHILDREN WITH CONVERGENT STRABISMUS

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Most authors are of the opinion that hyperopia tends to decrease with the advancing age of the patient. To investigate this idea a survey was made, taking into consideration only children with convergent strabismus. Monocular convergence was present in eighty-five cases, and alternating convergence in sixteen cases. A study was made of the average norm of refraction under atropine cycloplegia, and the results of the first examination were compared with those obtained upon the last examination in the same case. It was found that an increase in hyperopia occurred in both the average norm and the average astigmatism, the sphere increasing in a greater number of cases and to a greater degree than the cylinder. From the Department of Ophthalmology of the Children's Memorial Hospital. Read before the Chicago Ophthalmological Society, February 18, 1935.

An extensive treatise by B. A. Randall[1] on refractive changes in the human eye appeared in 1885. He considered primarily school children, and exhaustively reviewed the work that had been done from the time of Ware, in 1813. Among the 125 investigators mentioned, the earliest figures were given for myopia alone, and it was not until 1861 that hyperopia as occurring in only 8.7 percent of 700 eyes between the ages of 9 days and 25 years was first mentioned by von Jaeger. Randall gives his figures for hyperopia as follows: Infants 91 percent, young children 82 percent, elementary school 76 percent, and in higher schools 56 percent. Up to that time astigmatism was more or less ignored.

Since this work of Randall, the authors, almost without exception, have considered the errors of refraction occurring among a great number of cases in the various age groups rather than compared the changes which occurred in the same group over a period of years. The general consensus of opinion has been that the hyperopic eyes of children tend to become less hyperopic with age.

W. C. Bane in 1889 was among the first to note changes especially in corneal astigmatism. About this time Edward Jackson[2] wrote probably one of his first papers on refraction, tabulating a group of 4,000 eyes, and stating that over one third of the eyes fell below 0.25 D. in astigmatism, and only one third above 0.5 D. This series, composed of the various age groups, gives 77 percent hyperopia, 1.3 percent emmetrophia, 15 percent myopia, 6.7 percent mixed astigmatism, and states that 65 percent of all subjects with hyperopia had astigmatism. S. C. Ayres[3] in 1891 said, "Alterations in the refraction of the eye come under our observation from time to time. Cases where hyperopic astigmatism has increased have been recently reported."

Zentmayer[4] in 1911 called attention to the fact that the refractionist must anticipate any type of change, saying, "simple hyperopia sometimes remains constant, but is subject to undergo both an increase and decrease." He further quotes MacNamara, William Norris, S. D. Risley, and Nettleship as being of the opinion that hyperopia does not increase; Randall said that he did not

notice a decrease in hyperopia in a single case. Zentmayer was of the belief that hyperopia may increase in all meridians at any time of life, but more frequently in early life. He quotes Jackson as saying that astigmatism remains the same in a great majority of cases with only two percent of all cases showing a decrease or increase. Thorington is credited with saying that hyperopic astigmatism is a congenital defect; and Duane is placed on record as stating that "astigmatism once developed, remains, on the whole, practically stationary during childhood . . ." and that any changes that do occur are slight, inconstant, and follow no special rule. Twelve years later, Zentmayer[5] came out with the idea that hyperopia decreased and astigmatism increased in a series of several hundred cases; but he divided all these into two groups: first, a small number of cases of congenitally high hyperopia with high astigmatism which show very little change in refraction, and, second, the large remaining mass of cases which do anything.

A. S. Tenner[6] in 1915 tabulated the refraction findings in 4800 school children as follows: at 5 years of age, 91 percent were hyperopic, 9 percent myopic, none emmetropic; while at the age of 13 years, 59.5 percent were hyperopic, 37 percent myopic, and 3.5 percent emmetropic.

T. H. Butler[7] in England, analyzing 10,000 refractions done over a period of ten years, also says that hyperopia diminishes, showing a decrease from +6.0 D. to +4.0 D., and even less, over a period of six years. He does admit that "others do not alter much," and even mentions that decreases in high hyperopia show changes similar to the myopic-crescent changes in myopia, even though the eyes are still hyperopic. Fundus examinations have been made as a routine in our clinic, and in many thousands of children this condition has not been noted. I have been impressed rather with the number of cases of high myopia in which there were no fundus changes.

Ellett[8], in a paper presented to the American Medical Association in 1926, re-emphasized the fact that any change in hyperopia must be expected; and in discussing this paper, T. B. Holloway stated that he was "convinced that not all cases of increasing hyperopia in children are due to incomplete cycloplegia."

Jackson[9], who has contributed much to the art of refraction, offers a contrary view, recorded in 1932, when, while referring to pre-school children, he says, "During these first years there is a general change toward lessened hyperopia"; he also mentions B. A. Randall in 1890, as failing to find any case of decreasing hyperopia among many thousand cases. Jackson's[10] figures in 16,026 cases show before five years of age, 96 percent hyperopic; between 5 and 10 years, 86 percent; from 10 to 15 years, 73.1 percent; and from 15 to 20 years, 63 percent. Previously, he had followed 729 cases for ten years or longer. In the younger groups, the first examination was made on subjects between the ages of 2 and 20 years, with an average of nine years. At the last examination, this group ranged between the ages of 13 and 39 years, with an average of 26 years. Among 89 hyperopic patients thus studied, 30 percent showed an increase, 28 percent showed no change, while 42 percent showed a decrease in hyperopia. Among 34 myopic patients, 26 percent showed a decrease in the amount of myopia. Among 114 cases showing astigmatism, an increase in the amount of the cylinder occurred in 54 percent, no change in 34 percent, and a decrease in 12 percent.

C. F. Clark[11] studied his own cases covering 40 years of practice, and states that all kinds of changes occur, and thinks that they should be classified according to physiological or pathological refractive changes. He does not consider children, and cites twenty examples, ten of which show some type of ocular pathology. Among the other ten are: hyperopia without variation, 3; hyperopia increasing, 1; hyperopia with decreasing sphere and increasing cylinder, 2; myopia decreasing, 1; and myopia increasing, 3.

W. N. Sharp[12], tabulating 2,300 patients according to frequency of the various refractive errors with only 6 percent under the age of ten years,

found 67 percent to be hyperopic in both eyes.

A. Sourasky[13], conducting a survey for the Jewish Health Organization in London, had access to the records of 621 children between the ages of 5 and 14 years: 395 were hyperopic; 231 were followed for 3, 4, and 5 years, while 46 were followed for 6, 7, and 8 years. He found only a few who showed any increase of hyperopia, and ignored them in his analysis. In addition, he considered only changes of over ± 0.50 D. On this basis, of the 277 cases considered, he found no reduction of hyperopia in 65 percent, and only some reduction in 34 percent. He also found that unequal development of the refractive error occurs in cases of hyperopia as well as in those of myopia, and that some hyperopic patients tend to change as rapidly as do the myopic.

In Italy, A. Santonastaso[14], after examining 84 infants between the ages of one hour and twenty-two months, found 70 percent to be hyperopic, and, although he states that in the later months hyperopia was in excess, he adds that he thinks the eyes become less hyperopic as they become older.

Bothman[15], in analyzing his 124 cases under the age of six years, found that 71 percent increased in hyperopia from the first to the latest observation.

I. S. Tassman[16], made an exhaustive study of 11,743 cases, and concluded that the higher degrees of hyperopia diminish in older children. Up to the age of twenty years there were included 34 percent of his total number of cases, which were divided as follows:

Age years	Hyperopia percent	Emmetropia percent	Myopia percent
Under 5	97.8	1.2	1.0
5–10	87.1	4.3	8.6
10–15	70.4	10.1	19.5
15–20	63.2	12.1	24.7

Speaking of cases with squint, he says that nearly always the deviating eye revealed the higher degrees of astigmatism, and also that oblique astigmatism was found most frequently in these eyes.

In England, W. R. Dunstan[17], in 1934, believed that hyperopia lessened with age, and astigmatism remained constant. The following table of his seems worthy of repetition:

Author	No. of Cases	Age years	Hyperopia percent	Emmetropia percent	Myopia percent	Mean D.	Mode D.
Wibaut	2398	Newborn	97.5	2	0.5	+2.60	+1.25
Sorsby	672	4–8	91.5	6	2.5	+2.26	+2.31
B. of Ed.	2624	14–15	88.0	7	5.0	+2.28	+2.63
Wibaut	2920	Adolescent	31.0	32	37.0	−0.30	+0.20

He quotes Steiger and Tron as claiming that there is no standard length that can be adopted for the emmetropic eye. Apparently, if the length is less than 20.5 mm. the eye is hyperopic; if more than 25.5 mm. it is myopic; but between 21.6 and 23.9 mm. any type of refractive error may occur. As an explanation of the changes that occur, further study of anthropometry will be necessary.

In the study of corneal astigmatism, Jackson[18] found that "striking changes of corneal astigmatism occur when the astigmatism is of high degree. These are usually in the direction of decrease, which is more common than increase . . ."; but he thinks that, as a rule, corneal astigmatism does not change. He found some slight increases in astigmatism in the early period; whereas, fifteen years previously he[19] had said that in childhood astigmatism frequently increases. The directions of the axes of total astigmatism were given as:

Age years	Vertical percent	Horizontal percent	Oblique or no Astigmatism percent
Under 10	55	14	31
10–20	64	12	24

In 1931, Jackson[20] promulgated the study of refraction and its changes on the basis of the norm of refraction. Among 8,000 cases only 8 percent were below the age of twenty years, and these were divided as follows:

Age years	Hyperopia percent	Average Refraction Diopters	Emmetropia percent	Myopia percent
Under 5	96.0	+3.07	4.0	None
5–10	86.3	+1.95	5.6	8.1
10–15	73.1	+1.51	10.8	16.1
15–20	63.6	+1.20	10.7	25.7

It was interesting to note that beyond these years the average hyperopia increased slowly to +1.80 D. after sixty years of age. From Jackson's closing remarks I quote: "With reference to the general study of norms this study shows that they are of great importance, and it also showed me that we are at the beginning of the study of norms. In this study, we shall get the most help from individual studies that men make of their own work. Then we may be able to do something in the way of collective study. . . . Those who are interested must go ahead and study their own records."

As mentioned at the beginning of this paper, only a limited amount of work has been done in comparing the changes which occur in the refractive errors of the same group of cases in the course of years, and even less has been said about such changes in cases of convergent strabismus. It must be remembered that, in the figures previously given, all types of refractive errors have been taken as a group, so that the apparent decrease in the percentage of hyperopic subjects among older children is brought about by the natural increase in the number of cases of myopia. In a conversation, Dr. Jackson told me that today we are inclined to accept the findings of pioneers in ophthalmology without considering the fact that from an analysis of our present knowledge we might arrive at an entirely different conclusion.

For these reasons, I made a study of the changes of the refractive errors in a group of children with convergent strabismus seen in the Out-Patient Clinic of the Children's Memorial Hospital. During a period of eighteen months, 101 such children were seen who had had their refraction measured two or more times over a period of years; 85 had monocular, and 16 had alternating convergent strabismus. I have attempted to analyze these cases for what they are. All examinations were made in the usual manner under atropine cycloplegia, and were calculated and recorded by the method of cylinder skiascopy, using plus cylinders for the coincident astigmatism found in either hyperopia or myopia. For the sake of simplicity, I will designate as the fixating eye and squinting eye those in the monocular group, and as the alternating eyes those in the alternating group. None of the patients, except for refractive errors, had any ocular defects such as corneal, lenticular, or fundal lesions.

Monocular strabismus

In the monocular group were 44 boys and 41 girls. The first examination was made when they were between the ages of 2 and 11 years; the average age for the group was 5.7 years. The last examination was made when they were between the ages of 3 and 13 years; the average age was 8.2 years. The average number of years between examinations was 2.5; 22 percent of this group were examined more than twice.

The average norm of refraction for the squinting eye upon the first examination was +4.21 D. Ninety-five percent of the eyes were hyperopic +4.60 D.; 5 percent were myopic —3.63 D.; none were emmetropic. Upon the last examination the average norm was +4.49 D.; 95 percent showed a hyperopia of +4.93 D.; 4 percent a myopia of —6.08 D. and 1 percent emmetropia.

The fixating eyes upon the first examination showed an average norm of +4.05 D.; 97 percent a hyperopia of +4.22 D.; 2 percent a myopia of —0.81 D., and 1 percent were emmetropic. Upon the second examination, the average norm was +4.28 D., with 97 percent hyperopic +4.44 D., 2 percent myopic —0.37 D., and 1 percent emmetropic.

The average change between the norms of the first and second examinations of the squinting eye was an increase of +0.28 D.; 53 percent increased an average of 0.87 D.; 11 percent showed no change, while 36 percent decreased 0.53 D. An increase of 1.0 D. or more occurred in 13 percent, and a decrease of 1.0 D. in 6 percent. The greatest increase was 4.0 D., the greatest decrease 3.5 D. in the case of a real myopia, and 1.37 D. in one of hyperopia.

In the case of the fixating eye there was an average increase in hyperopia of +0.23 D.; 55 percent increased an average of 0.81 D.; 4 percent showed no change, and 41 percent decreased 0.53 D. An increase of 1.0 D. or more occurred in 15 percent, and a similar decrease occurred in 6 percent of the fixating eyes; the greatest increase amounted to 3.87 D., while the greatest decrease in a hyperopic eye was 1.87 D.

As regards the cylindrical errors, the squinting eye showed an average increase in astigmatism of +0.16 D.; 41 percent increased an average of 0.72 D.; 28 percent showed no change, and 31 percent decreased 0.45 D. In the case of the straight eye, there was an average increase in astigmatism of 0.04 D.; 38 percent increased 0.56 D.; 27 percent showed no change, while 35 percent decreased 0.48 D.

The axes of the cylinders revealed the following positions:

	Squinting Eye		Fixating Eye	
	First Exam. percent	Last Exam. percent	First Exam. percent	Last Exam. percent
Vertical	76	85	78	79
Oblique	11	13	9	13
Horizontal	None	1	1	6
No astigmatism	13	1	12	2

The only real conclusion at which one might arrive from this tabulation is that in by far the greatest majority of cases the axes are with the rule. A slight increase occurred in oblique as well as in horizontal meridians upon the last examination; but there was, likewise, an increase in the number of vertical axes, all corresponding to the decrease in nonastigmatic eyes from the first to the last examination. The statement that the axis of the cylinder was more difficult to determine in a squinting, poorly fixating eye is not shown by my figures. As a matter of fact, 12 percent of the cases of alternating squint showed no astigmatism on the first examination as compared with no cases without astigmatism upon the last examination.

Among eight squinting eyes, a change in the direction of the axis occurred: 4 from vertical to oblique, and 4 from oblique to vertical. Among 13 fixating eyes, 6 changed from vertical to oblique, 3 from oblique to vertical, and 2 from oblique to horizontal.

Alternating strabismus

This group, consisting of nine boys and seven girls, a total of 32 eyes, were at an average age of 5.2 years upon the first examination, and 8.1 on the last, with an average span of 2.9 years between examinations. The youngest and oldest ages at first examination were 2 and 10 years, and at the last examination were 4 and 12 years, respectively. Six cases were examined more than twice.

The refractive norm upon the first examination was +4.01 D., 31 eyes showing average hyperopia of +4.15 D. and one eye a myopia of —0.12 D. Upon the occasion of the last examination, the average norm was +4.42 D., with 31 eyes showing a hyperopia of +4.59 D. and one a myopia of —0.75 D.

These findings represent an average increase in the norm of +0.41 D.; 59 percent showed an increase of 0.91 D.; 13 percent showed no change, and 28 percent a decrease of 0.45 D. Of these alternating eyes, a change of 1.0 D. or more occurred as an increase in 28 percent, and a decrease in 3 percent. The maximum changes were +2.0 D. and —1.0 D., respectively.

Analyzing the cylindrical findings, we discover an average increase in astigmatism amounting to +0.21 D.; 50 percent of the eyes increased 0.73 D., 31 percent showed no change, and 19 percent decreased 0.83 D.

The position of the axes of the cylinders in these alternating eyes were as follows:

	Vertical percent	Oblique percent	Horizontal percent	No Astigmatism percent
First examination	66	16	6	12
Last examination	75	19	6	None

Among these, three eyes showed a change in the direction of the cylinder upon the last examination; one from vertical to oblique, and two from oblique to vertical.

Conclusion

1. One is forced to admit, as far as these figures are concerned, that there is an increase in the average hyperopia in both the converging and the fixating eye in cases of children with convergent strabismus under 13 years of age.

2. In the refractive norm of the 202 eyes, I found an average increase in hyperopia of 0.77 D. in 55 percent, no change in 8 percent, and a decrease in hyperopia of 0.51 D. in 37 percent, giving an increase for the entire series of +0.23 D.

3. The astigmatism increased +0.66 D. in 41 percent, remained constant in 23 percent, and decreased 0.52 D. in 36 percent of all cases. This accounted for an average increase in astigmatism of +0.08 D.

4. The decrease in hyperopia appeared equal in both the average norm and average astigmatism, as regards both amount and percentage.

5. The norm increased more often than the astigmatism did and to a slightly greater amount.

6. The average norm upon both first and last examination was slightly higher for the converging than for the fixating eyes.

7. The average norm of the eyes with alternating convergent strabismus closely resembled the average norm of the fixating eyes in monocular strabismus.

8. The evidence tends to show that in this series the increase in hyperopia occurred through the medium of the sphere rather than that of the cylinder.

I wish to acknowledge my gratitude to Dr. Richard C. Gamble, Attending Ophthalmologist at the Children's Memorial Hospital for his suggestions in the preparation of this paper.

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Several Examples Recorded in Norms and Cylinders

1. Maximum Increase

Male—right eye in at age of 2 years. Eyes straight after age of 4 years.
Vision R. 20/20; L. 20/20.

Age 2	Age 4	Age 7	Age 8
R. +3.50 D.	R. +5.75 D.	R. +7.50 D.	R. +7.50 D.
L. +4.00 D.	L. +5.75 D.	L. +8.00 D.	L. +7.87 D.
Cylinder			
R. none	R. +0.50 D. axis 90°	R. +1.00 D. axis 75°	R. +1.00 D. axis 70°
L. none	L. +0.50 D. axis 90°	L. +1.00 D. axis 85°	L. +0.75 D. axis 85°

2. Maximum Decrease

Male—right eye in
Vision R. 20/50; L. 20/20.

Age 7	Age 10
R. +7.25 D.	R. +5.87 D.
L. +5.25 D.	L. +3.37 D.
Cylinder	
R. +2.50 D. axis 90°	R. +2.75 D. axis 80°
L. +2.00 D. axis 110°	L. +1.75 D. axis 120°

3. Case of Myopia and Mixed Astigmatism

Female—right eye in at age of 7 years. Eyes straight at age of 11 years.
Vision R. 20/30; L. 20/20.

Age 7,	Age 9,	Age 10,	Age 11,
R. —8.50 D.	R. —9.50 D.	R. —11.50 D.	R. —12.00 D.
L. Plano	L. Plano	L. — 0.75 D.	L. — 0.62 D.
Cylinder			
R. +1.00 D. axis 105°	R. +1.00 D. axis 105°	R. +3.00 D. axis 110°	R. +5.00 D. axis 105°
L. +2.00 D. axis 105°	L. +2.00 D. axis 75°	L. +2.50 D. axis 75°	L. +2.75 D. axis 75°

4. Maximum Increase in Alternating Strabismus

Male
Vision R. 20/20; L. 20/20.

Age 3,	Age 4,	Age 6,	Age 8,
R. +4.00 D.	R. +3.50 D.	R. +5.25 D.	R. +5.87 D.
L. +3.50 D.	L. +3.50 D.	L. +5.62 D.	L. +5.50 D.
Cylinder			
R. +1.00 D. axis 75°	R. +1.00 D. axis 80°	R. +2.00 D. axis 85°	R. +2.75 D. axis 80°
L. +2.00 D. axis 105°	L. +1.00 D. axis 100°	L. +1.75 D. axis 90°	L. +2.00 D. axis 90°

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PARINAUD'S SYNDROME

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In this case manifesting Parinaud's syndrome, other symptoms were paralysis of convergence and other eye-muscle pareses in association with dysmasesia, dysphagia, dysphonia, incoordination, astasia abasia, myasthenic symptoms, and slight disturbances of sensation and of the abdominal reflexes. The author discusses such brain-stem syndrome in its possible relations to pinealomata, to different forms of encephalitis, to tuberculosis and syphilis, to myasthenia gravis, and to multiple sclerosis. This clinic was given at the Johns Hopkins Medical School on March 14, 1935.

The patient, Margaret H., aged 22 years, was admitted to Osler 4 (service of Professor Warfield T. Longcope) in the Johns Hopkins Hospital on February 9, 1935, complaining of weakness of the legs of one-and-a-half-years' duration, of periods of falling and inability to walk during the past three months, of earlier difficulty in chewing and in swallowing solid foods, of seeing double, of weakness of the arms, and recently of inability to speak above a whisper.

The **family history** had no bearing upon the patient's case.

As to her **past history,** the patient had been healthy and robust in girlhood, had attended college and become athletic supervisor of playgrounds; later she was table waitress until the onset of the present illness. She had had chicken pox, measles, whooping cough, mumps, and scarlet fever in childhood. In the autumn of 1933 she had had a fall, bruising the right shin, but it healed quickly.

Present illness: In 1931 (about four years before admission) she began to have localized pains in the left knee without a preceding history of trauma. There was no swelling and there had been no previous sore throat. One decayed molar tooth was extracted after an X-ray examination although it is said there was no infection at its apex. Later on, she had pain in both hips and down the thighs, these pains being as marked in the recumbent position as on motion. About one-and-a-half years ago she noticed that her legs were getting weak and that it was an effort to lift the feet. As playground supervisor she found she could no longer run. There was no increase of this weakness, however, on use and no sense of fatigue nor weakness elsewhere. The pain in the hips and lower extremities disappeared about nine months ago.

In March, 1934 (about eleven months ago), she began to vomit immediately after each meal. The vomiting was not projectile and was not preceded by nausea, epigastric pain, or headache. This vomiting continued for some five months, then stopped for a month, to recur for a short period, since when there has been no vomiting. By August, 1934, she had lost 38 pounds in weight.

During the past nine months she has had difficulty in chewing and swallowing solid food; she says that her jaws were weak and that she had to wash down her food with milk; her appetite was poor except for raw eggs and milk and she took but little other food. Her family physician kept her in bed for four weeks but without definite improvement. She has had marked constipation during the past six months. Occasionally there has been transient numbness in the feet, sometimes in one, sometimes in the other; also occasionally in the hands. The mother states that on walking, before she became unable to walk, she bent the trunk forward at the hips; the mother also noticed that she kept her feet wide apart when standing.

Ten weeks ago she had to put her hands to the wall to steady herself on standing. Sometimes she would fall limply to the floor without loss of consciousness and without incontinence of urine or biting of the tongue.

About eight weeks ago she noticed that her arms tired on combing her hair though this weakness was variable; the grip in the hands was sometimes strong, sometimes weak, and she states

positively that they were not made worse by use. She spoke of her eyes as being pulled toward her nose; sometimes she saw double unless one eye was covered, and the family noticed some disturbance in the movements of the eyes. A physician gave her some hormonal injection weekly for six weeks, the nature of which we have not learned.

During the past few weeks there has been increased emotional excitability, sometimes long crying spells, and she has fallen more frequently.

For two weeks before admission she remained in bed; could hold a glass but often missed the table when trying to place the glass upon it. The family noticed much variability of the symptoms. After one week in hospital in Frederick, Maryland, she entered the Johns Hopkins Hospital for study and treatment.

Physical examination. On admission her weight was 104 (28 pounds below her maximal weight in 1933, but ten pounds above her minimal weight in August, 1934). Outside the neuromuscular system, the physical examination revealed slight chronic tonsillitis; pulse rate of 100; blood pressure varying between 100 and 115 systolic, and 78 and 88 diastolic; a little leucorrhoea, some fecal impaction, and flat feet.

On neurological examination, the patient complained of diplopia, more marked on looking to either side; there was slight right ptosis, inability to look upward with either eye, limitation of looking medialward in both eyes, more marked on the right, and nystagmus in the left eye on looking to the left. Downward movement of the eyes was not restricted. No objective disturbances in the domain of N. VI, N. VII, or N. VIII. As to NN. IX and X, the voice was very weak, usually in a whisper. At present there is no difficulty in swallowing though there has been earlier and the palate moves well. Gag reflexes are active. No disturbances were observed in the domain of N. XI or N. XII.

Objectively, the patient has excellent strength in all muscle groups of the extremities and there is no evidence of atrophy, spasticity, undue flaccidity, fibrillary twitching or tremor. No objective disturbance of cutaneous sensibility can be made out.

On testing coordination, gait and station are bizarre. When she stands with the feet together she holds strongly to the examiner or the bed and sways. In spite of the excellent strength in her legs she does not move them. They almost crumple under her at times. When made to walk with an observer on each side, the feet are advanced timidly or not at all. She shows good strength in the hands and in the arms on clutching support. When she falls, the fall is in no definite direction but always toward a support. At present she does not attempt to stand with a broad base. Impossible to test the Romberg but heel to knee and finger to nose tests are well performed. There is no evidence of asynergy. On testing for adiadokocinesis, she cannot open and close her hands rapidly nor rotate them back and forth rapidly, and she performs all movements slowly.

She is oriented as to time, place, and persons. Calculation is slow but usually accurate. There is no astereognosis. All her mental processes have been slowed up. The patient has been listless, apathetic, and weak. There has been no sphincter disturbance. At times the abdominal reflexes are absent, especially on the right side, though at other times they are obtained. The deep reflexes in the extremities are more active on the left than on the right. Babinski and Kernig reflexes are negative.

Laboratory tests. *Cerebrospinal fluid* (February 12) was clear, the initial pressure 36. On left jugular compression, pressure was 100, with fair rise and prompt fall. On right jugular compression, pressure was 160, with prompt rise and fall. On abdominal pressure there was a rise to 40 or 60. Only four cells were present (lymphocytes). Wassermann reaction was normal. Flocculation test normal. Colloidal mastic test 2210000000. Cultures negative.

Blood: negative except for very slight secondary anaemia. As she had been taking bromides for some time the blood bromides were estimated and found to be 85 mg. per cent.

Urine: negative for albumin, sugar, and

casts; many white corpuscles and an occasional red cell were seen. Negative for bile, acetone, and diacetic acid.

During her stay in the hospital studies of creatin and creatinin metabolism were made. The total output was about twice as high as that of normal persons.

Basal metabolic rate. An attempt to determine this was made but the cooperation was so unsatisfactory that no reliance could be placed upon the result.

Treatment. During the past few days she has been given ephedrine sulphate and glycine and since then has shown remarkable improvement. She can now speak aloud, though the voice is rather explosive and there is a tendency to scanning. With someone at her side for support she now walks a few steps. She is much encouraged. There is less depression, though the tears are still near the surface. She receives an abundant diet in order to force a gain in weight.

Discussion of the Symptoms and of Their Localizing Value

The ocular-muscle paralyses. On examining the eye movements carefully again, we find that there is still moderate ptosis on the right. On looking straight forward, the eyes are not quite parallel, the left eye remaining slightly divergent, and there is diplopia. On looking at an object to the right, the right eye is abducted perfectly but the left eye is not adducted quite fully. On looking at an object to the left, both eyes move well to the left. On looking at an object near the tip of the nose, the right eye converges only slightly and the left eye not at all; a few days ago the left eye actually diverged on attempt at convergence. On looking upward, the right eye moves but slightly up, the left eye much more than the right. On looking downward, both eyes move down normally. The pupils are equal and react normally to light.

Evidently the paralysis of movement of the eyes is undergoing some change. The complete loss of upward gaze (Parinaud syndrome) that was present on admission has passed off. Also the divergence of the left eyeball that occurred on attempts at convergence has disappeared.

Considering the history and the present condition we see that a part of the eye-muscle paralyses must have been supranuclear, and a part nuclear or infranuclear in origin. Thus, the paralysis of the conjugate movements upward (Parinaud syndrome) is a supranuclear paralysis of the corticonuclear paths for voluntary upward gaze, this function being lost in lesions of the posterior cerebral commissure in the prehabenular region. And, again, the total convergence paralysis (despite retention of the power to move each eye medialward on lateral gaze) is a supranuclear paralysis, due either to failure of function of the convergence center or of the paths leading from it to the nuclei of the third nerves.

As to the ocular-muscle paralyses that are of nuclear or of infranuclear origin we must mention (1) the right-sided ptosis and the paralysis of the right superior-rectus muscle—pointing to the neurones the cell-bodies of which are in the lateral portion of the nucleus of the third nerve on the right side, and (2) the slight paresis of the left medial-rectus muscle and of the left superior-rectus muscle—pointing to the neurones the cell-bodies of which are contained in the lateral portion of the nucleus of the third nerve on the left side. There is no evidence of nuclear or infranuclear involvement in the domain of the fourth nor of the sixth cerebral nerve, since trochlear and abducens functions are well performed. Moreover, since the pupils are equal and react normally to light the medial portion of each oculomotor nucleus must be intact. No evidence of internuclear ophthalmoplegia, anterior or posterior, due to injury of the fasciculus longitudinalis medialis (posterior longitudinal bundle) of either side could be made out.

The other neurological symptoms. At present, chewing does not seem to be disturbed but for a long time there was marked *dysmasesia* pointing to nuclear or infranuclear involvement of the motor part of the N. trigeminus, or to myasthenia. Swallowing is also easy now, though for a time the patient had marked *dysphagia,* fluids sometimes regurgitating through the nose, as in diphtheritic paralysis, pointing to nu-

clear or infranuclear involvement of the N. glossopharyngeus (N. IX). The marked *dysphonia* that prevented speech above a whisper for a time pointed to the N. vagus (N. X); possibly the months of *vomiting* that occurred may have been of vagal origin also.

The behavior of the reflexes is interesting. The absence at times of some of the abdominal reflexes is suggestive of slight impairment of the pyramidal tracts, even though a positive Babinski reaction has never been elicited.

The *astasia abasia* may be a functional disorder superimposed upon the organic process, through the *incoordination* in placing a glass upon the table and the *sudden loss of tonus of the muscles of the legs* causing the patient to fall at times, make one keep in mind the possibility of disturbance of function of the red nucleus (as observed by A. van Gehuchten in certain cases). The *disturbances of the emotions* may represent a reactive emotional depression, though the bare possibility of an associated thalamic disturbance should not be lost sight of.

When we think of the symptomatology as a whole, we find that the disturbances of function point predominantly to the region of the brain stem, from the junction of the aqueduct of Sylvius with the lower end of the third ventricle downward through the midbrain and the pons to the nuclei of the 9th and 10th cerebral nerves in the lower part of the medulla oblongata—in other words, to a diencephalic-mesencephalic-rhombencephalic syndrome.

Discussion of the Possible Nature of the Underlying Disease Process

Though the symptoms point to the brain stem, the involvement of its different parts would seem to be very unequal. Thus, we have evidence suggesting disturbances of function of the commissura posterior cerebri in connection with upward gaze, of the supranuclear center for convergence of the eyes, of the red nucleus in its tonus inhibition, of the right and left oculomotor nuclei, of the motor nucleus of the trigeminus, of the nuclei of origin of the glossopharyngeal and vagal nerves, and perhaps to a slight extent of the pyramidal tracts and of the paths of co-ordination; but there is no evidence of disturbance of the pupillary centers or conduction paths, nor of the nuclei of the 4th, 6th, 7th, 8th, 11th, or 12th cerebral nerves.

It would be difficult, therefore, to think of any one single lesion that could account for the symptoms; multiple lesions would seem to be much more probable.

A *pinealoma* should of course be thought of as a possibility since the Parinaud syndrome has often been associated with such a tumor. As a rule, however, with a pinealoma there is marked increase of intracranial pressure with choked discs, not present in this patient. Still, at least two cases of pinealoma have been observed without signs of increased intracranial pressure. Another argument against the diagnosis of pinealoma is the involvement of parts so far removed from the pineal region as the nuclei of the glossopharyngeal and vagal nerves, unless we assume that some process in addition to a pinealoma has been active. The symptoms, however, seem to have begun in the lower part of the brain stem rather than in the upper part.

Tuberculosis of the pons and of the red nucleus can give rise to remarkable ocular symptoms and to disturbances of muscle tonus as van Gehuchten pointed out in 1933, but the personal and family history of this patient is not at all suggestive of tuberculous infection. Before the present illness she was a powerful athletic director and lived much in the open air. Moreover, tuberculin tests have yielded negative results.

Syphilis is ruled out by the negative history and by the fact that the Wassermann reaction is negative in both the blood and the spinal fluid.

An *asthenic bulbar paralysis (myasthenia gravis)* should certainly be thought of as a possible explanation of the symptoms. The disturbances of chewing, of swallowing, and of speaking are very suggestive, as are the studies of creatin and creatinin metabolism in the patient. Moreover, in 1933, Silbermann described an especial asthenic ophthalmoplegia ("eye myasthenia") in which

there were ocular-muscle paralyses of variable intensity observable over many years, the case having been seen and described by Karplus as early as 1897. But the symptoms in our patient differ much from those of the typical Erb-Goldflam myasthenic syndrome; the disability is not increased by use of the muscles, the symptoms are just as prominent in the morning as they are in the evening, there is evidence of supranuclear involvement of certain of the eye-muscle paths, and Jolly's electrical myasthenic reaction is not elicitable. It must be admitted, however, that there has been marked improvement in the patient's symptoms during the past few days, since treatment with ephedrine sulphate and glycine was begun.

Epidemic encephalitis or a *localized encephalitis of the brain stem* or a *disseminated encephalomyelitis* like that described by Stout and Karnosh (1933) might give rise to multiple small lesions such as we see in this patient and those possibilities should also be given consideration. In such cases there may be disturbances of talking and swallowing, diplopia, eye-muscle paralyses, slight sensory disturbances (including pains in the lower extremities).

Another organic disease would, however, seem to me to be more probable in our patient, namely, *multiple sclerosis*, especially on account of the evidence of multiple lesions. Against the idea of a disseminated sclerosis, however, is the absence of temporal pallor of the optic discs; moreover, the abdominal reflexes, though absent at times, are present at other times; and if multiple sclerosis exists it is surprising that there has not been more evidence of injury to the pyramidal tract and to other white fibers of the brain and spinal cord. Still, multiple sclerosis may present very bizarre symptoms in certain cases; moreover, marked remissions and exacerbations are characteristic of the disease. The age of the patient is entirely consonant with the possibility of multiple sclerosis. And, recently (1933) H. Schaeffer has described a case of multiple sclerosis in association with the syndrome of Parinaud and with myasthenic symptoms!

Hysteria alone could not account for the symptoms in this patient, though the astasia-abasia makes one think of a possible superadded hysterical component. The depression with recent attempt at suicide is probably to be looked upon as a *reactive depression*; its existence would not be surprising, considering the condition in which the patient finds herself.

We can scarcely go further at present in differential diagnosis; doubtless the course of the malady will later on remove all doubts as to its nature.

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BLEPHAROCHALASIS

Report of a Case with Pathological Histology

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The patient, a 14-year-old boy, complained of swelling of both upper lids for four years. Examination showed the lids to be puffy, the skin thinned, and the superficial vessels dilated. The past history was negative, except for an attack of hives one year previous to admission. All laboratory tests were within normal limits. The redundant skin of both upper lids was resected and the skin edges were sutured to the upper margin of the tarsus. Histological section of the resected skin showed increased vascularity, looseness of the corium, and thinned epidermis. From the Ophthalmological Clinic of the University Hospitals of Cleveland.

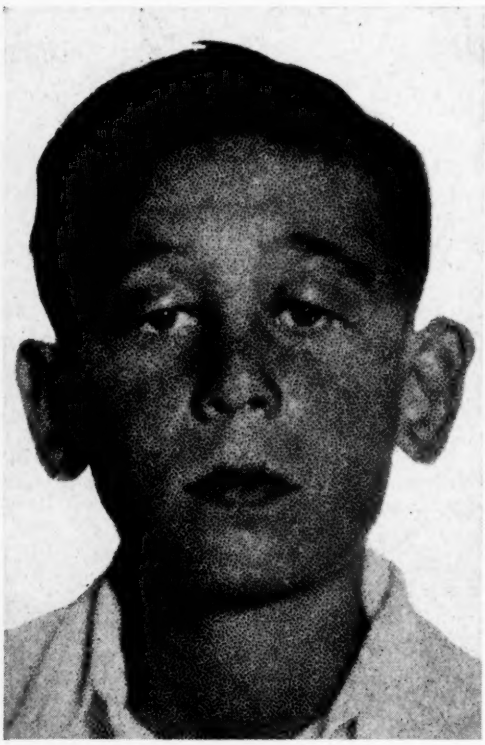

Fig. 1 (Gunther). Blepharochalasis.

Blepharochalasis (Gr. eyelid-relaxation) is the name given by Fuchs to a condition which is characterized by bagginess of the upper lids. The skin is thinned, and dilated vessels may be seen near the surface. The lids give the appearance of being edematous, but there is no pitting.

The etiology of the disease is unknown. Nearly all of the cases reported had their onset at about the age of puberty, perhaps substantiating the theory that there is a relationship of this condition to the activity of the endocrine glands. It is seen more frequently in females than in males.

The onset of the disease is insidious, and there is usually intermittent swelling of both upper lids in the early stages. In the later stages the swelling is permanent and the lid has a red color due to the dilated vessels and the thinness of the skin. In this stage there is often wrinkling of the skin with narrowing of the palpebral fissure.

The only relief for blepharochalasis is surgical. The excess skin is resected, and the edges are sutured together, the

lower skin margin being anchored to the tarsus.

Case report. A. K., a white boy, aged 14 years, American born of Slavic parents, came to the clinic in April, 1934, complaining of puffiness of the lids of four years' duration which at the onset was intermittent in character but had never entirely disappeared. During the eighteen months previous to admission the puffiness had been constant and marked. The general history was irrelevant except for an attack of "hives" twelve months before admission.

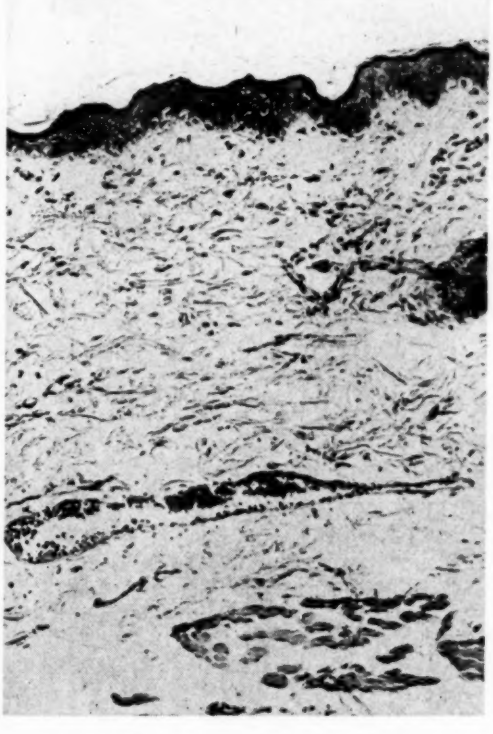

Fig. 2 (Gunther). Photomicrograph of sections of skin of the lower lid stained by hematoxylin and eosin. The epidermis is thin with obliteration of papillae, and there is karyolysis, particularly in the deeper cells. The corium is very loose, is relatively acellular, and includes occasional perivascular collections of lymphocytes. The blood vessels in corium and subcutaneous tissue are numerous, dilated, and thin walled. The hair follicles and skin glands appear normal.

Physical examination showed 6/6 vision in each eye. Both upper lids were puffy and gave the appearance of edema. There was no pitting; on the contrary, the skin was soft and thin and could be grasped readily between the fingers. There were numerous superficial capillaries near the surface, giving the lids a red appearance. The palpebral fissure was narrowed because of the redudancy of the skin of the upper lid.

Fig. 3 (Gunther). Photomicrograph of section stained by Verhoeff's method, comparable to that in figure 2. In addition to the changes described in that figure, the paucity and looseness of elastic fibrils are shown.

The remainder of the examination of the eyes was negative. The blood Wassermann was negative, and the blood count was within normal limits. The urine was normal.

Operation was advised, and the redundant skin of each upper lid was removed. The margins were then sutured together and attached to the tarsus.

Histological examination. The specimen exhibited the characteristic structure of the external portion of the eyelid of man.

One surface was bounded by skin, the other by striated muscle. Hair follicles, sebaceous glands (of Zeiss), and sweat gland (of Moll) were present.

The epithelium varied considerably in thickness. There were areas with not more than four cell layers. The anterior surface had a thin layer of keratinized epithelium. Many of the basal cells were completely vacuolated with the nucleus crescent shaped and eccentric.

Fine, granular, golden-brown pigment partly embraced certain cells of the basal layer. The substantia propria was composed about equally of elastic and nonelastic connective tissue. The formation was rather loose.

Most noteworthy were the numerous blood vessels and a periarterial cell proliferation. Large blood vessels with single walls predominated. Many appeared newly formed. Others seemed distended with blood. The perivascular cells resembled endothelial cells and those of the perithelium. Their arrangement was frequently in layers around blood vessels.

Small clumps of golden-yellow pigment, apparently intracellular, were noted in the immediate neighborhood of blood vessels. An increased vascularity of the supporting tissue of the sweat glands was noted. There was an apparent dilatation of the lymphatic channels.

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COMPARISON OF INTRACAPSULAR METHODS OF CATARACT EXTRACTIONS

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This is a report of one hundred cases of experimental surgery done to determine the best method and procedure for average eye surgeons to follow in performing intracapsular cataract extractions. The Green modification of the Barraquer suction procedure is compared with the forceps operations, especially the Török-Elschnig method. Anesthesia, flaps and sutures, and postoperative complications are treated under separate headings. Actual visual results are noted for the diabetic cases, for cases of high myopia, of ruptured capsule, of loss of vitreous, and also the results of all cases regardless of complications. The conclusion, comparing the suction or vacuum versus the forceps operations, is in favor of the former in the hands of those sufficiently skilled to perform it safely, but in favor of the latter for average eye surgeons, because it is simply a step further after mastering capsulotomy with forceps rather than with a cystotome. Accepted for publication April 11, 1935.

On several occasions I[1,2,3] have reported on intracapsular extraction of cataracts with the Green modification of the Barraquer operation.

This series of one hundred cases of intracapsular extractions was begun as experimental surgery at St. Luke's Hospital, and I wish to present our findings and experiences to date. As in the last report, this contribution is not made to show percentages of success or failure, but to advise the average eye surgeons, who may be considering the adoption of intracapsular versus extracapsular methods, what they may expect. May it be restated here: "Those who have tried to do any one of the intracapsular operations and have been unsuccessful have failed because of lack of sufficient animal experimentation before beginning on the human eye. Also, they may have tried to do a type of intracapsular operation not suited to their own surgical personality[3]."

Some of the problems and pitfalls of anesthesia, flaps, sutures, and postoperative complications are treated herein under separate headings. Regardless of which operation is attempted, too great stress cannot be laid on the "section": it must be large enough, preferably three fifths of the cornea, and the knife must be very sharp, so as to cut smoothly without pressure. Complete control of the patient by means of satisfactory anesthesia together with a bridle suture and with a large enough section is all important for good results.

It is no longer necessary to argue in favor of intracapsular surgery although there are still many operators who prefer the extracapsular methods. So many men have presented material in favor of the intra- versus extracapsular technique that it is superfluous to say more except to add another experience[4–43, 107, 108, etc.]

For a long time the cases for this type of operation were selected but, having successfully operated on several patients with high myopia and fluid vitreous, and several with glaucoma, and also on some patients with posterior synechiae (after breaking the synechiae), I now exclude only very prominent eyes, dislocated lenses, recent traumatic cataracts, and congenital cataracts in younger patients. The youngest in my series of cases was thirty-nine years old.

Diabetic patients have been found particularly sensitive to soft lens matter and fortunately the intracapsular operations work well with them. Of this present series fourteen were diabetic, with all stages of retinal and vascular changes. The results varied proportionately to the vascular condition, from vision = 20/15 to light perception.

Diabetics:
5 cases = 20/20 and better
2 cases = 20/25
1 case each of 20/30; 20/40; 20/70; 20/100; 10/200; 6/70; and light perception.

Of higher myopia there were eight cases, with these results:

	Diopter	Vision
1 case	—14.	= 20/70
1 case	—18.	= 20/15

1 case —12. = 20/50+
1 case —14. = 20/20+3
1 case —15. = 20/200
1 case —12. = 20/20+
1 case — 5. = 20/50+
1 case —13. = 20/30+

All of these had more or less advanced myopic fundus changes.

After mastering the Green modification of the Barraquer method with animal experimentation followed by eighty-six operations on human eyes, it seemed well to proceed to the capsule forceps methods for a comparative group. Of course the above experience with the Green apparatus aided tremendously in the performance of the forceps operation. The Smith operation[36, 37] is not herein considered at all, because of its greater risk and practically nonuse in this country[21, 38, 39].

The Stanculeanu-Knapp[11, 12, 26, 40, 41] operation is of course excellent. Fisher's latest operation, namely, dislocating the lens with a vacuum cup which is then released and the lens extracted by expression as in the Knapp procedure, is in the same category as the latter type. Both of these methods appear unsatisfactory for two reasons: first, Why deliberately let go of a lens capsule after once grasping it? If the forceps or vacuum cup slips off or the capsule ruptures, we have no other choice of procedure; but if the forceps or vacuum cup has enough hold on the capsule to dislocate the lens, not much pressure from below is required to push the lens gently, either by tumbling or directly, up and out of the wound, while continuing extraction with the forceps at the same time. Second, Why deliberately do an expression operation with its greater risk of loss of vitreous rather than an extraction combined with slight pressure expression, which produces less trauma, has less risk of vitreous loss, and is easier to do?

Verhoeff's method with his own forceps, long advocated by himself[44, 45] and by Greenwood[46], and lately by Castroviejo[4] and Marc Anthony[23], with modifications, I have attempted only a few times, but not in this series. As yet, although still open to persuasion, I am not convinced that it is as easy to perform as the Elschnig. That is, the Török-Elschnig[47–54] technique with the Kalt or some other capsule forceps seems to be the most logical forceps operation for the average eye surgeons to undertake. Elschnig's technique is as follows: After routine preparation, proper anesthesia, and completion of the section, with the Kalt or more recently the Elschnig or Arruga forceps "the capsule of the lens is grasped for about 1.5 mm. in the lowest part of the dilated pupil. The lens is moved gently from side to side for about eight to ten seconds. The lens is then lifted with the forceps while the lower margin of the lens is pushed upward so that the lens tumbles and its lower edge engages the wound[54]."

If, with the Elschnig attempted, the capsule ruptures, as in a certain percentage of cases it will, an extracapsular extraction must be faced with the possible necessity of having to irrigate the anterior chamber to be rid of soft lens matter. Furthermore, some of these cases will require a later needling operation: but at least an intracapsular was tried and nothing was lost in the effort. If, again, the forceps slips off the capsule without rupturing it and if the lens has already come forward by dislocation, the procedure is as in the Knapp technique to complete the delivery of the lens by expression. After all, the result that must be attained is the delivery of the lens in the simplest and least traumatic way available, and if possible without loss of vitreous. Provided the lens, preferably in its capsule, is entirely removed, the method matters not at all. Herein, again, the final selection of the procedure to be adopted and the success to follow depend on the individual surgical personality.

Anesthesia

Doctor Lancaster's monograph, "The cataract operation. A study of details[55]," fully covers the question of anesthesia, and with a few minor changes I am at present following his routine.

The practice of making retrobulbar injections, advocated by the Green brothers[56], Rodstein[57], Manes[58], Elsch-

nig[54, 59, 60], Lancaster (in some cases[55]), Meller (quoted by Crisp editorially[61]), Gradle[62], Van Lint[63], Sinclair[64], Radlicky[65], and others, has certainly had a wonderful following. We have used it twenty times, and have given it up as an unnecessary risk with other methods available.

Akinesia, as performed by O'Brien and Van Lint, i.e., the injection of the seventh nerve below the zygomatic arch, has been urged by many operators (Gradle[62], Van Lint[63], Gomez[66], Elschnig[54, 59] etc.), but at St. Luke's Hospital we have not tried it. Paralysis of the orbicularis by the "Y" injection, using 2 c.c. of 2-percent novocaine with adrenalin 1:1000, ten to fifteen minutes before operation, was induced in most cases with excellent results, in combination with other items to be discussed. This detail mentioned by Fisher[67], Traquair[68], King[69], and Knapp[70] as well as most of the above-listed operators is employed very generally.

For preparatory sedatives, bromides[71], sodium barbital[55], luminal[55], sodium amytal[55], are all used more or less. Cruise quoted by Ballantyne[72] has used hyoscine and morphine with atropine. I have found no other mention of this combination, except that Lancaster sometimes used hyoscine to produce more complete relaxation in a restless patient[55]. As recorded in a previous contribution[3], at St. Luke's Hospital we used morphine, grains 1/6, and hyoscine, grains 1/200, by hypodermic injection, one-half hour before operation, over a period of nearly two years, in all cataract cases. Although this combination produced a beautiful partial anesthesia, it was followed frequently by nausea and vomiting. This my colleague, Doctor Alfred Wiener, and I felt was a greater risk than was warranted, and it was given up.

Doctor Lancaster's contribution[55] was a great improvement on all previous anesthesia proceedings. From his paper, I shall indirectly quote freely. As he stated, bad acting is preventable, and is, therefore, inexcusable. "There are three ways of controlling a reflex: (a) through the sensory arc by local anesthesia; then the patient cannot feel; (b) through the motor arc by akinesia; then he cannot move; (c) by reducing the sensitivity of the higher centers by sedatives; then he does not want to move even if he could."

At St. Luke's Hospital we operate in the afternoon, and to accomplish the above triad of Lancaster, the patient is given luminal, grains 1½, at 8:00 p.m. and 10:00 a.m. prior to the operation. Two-and-one-half hours before the operation a chlorotone rectal suppository, grains 10, and sodium amytal, grains 3, by mouth, are given. I have used 6 grains in some cases but have found 3 grains a better dose. Fifteen minutes before operation, the lids are injected with novocaine as stated above. If the patient is still restless, codeine phosphate, 1 grain, is given by hypodermic, or else this same dosage is given immediately after the operation. On the table, several drops of cocaine hydrochloride, 4 percent, with several drops of adrenalin 1:1000 are instilled, followed by subconjunctival injection below and above the cornea and sometimes along the insertions of the recti muscles of cocaine, 4 percent, with a few drops of adrenalin 1:1000 added.

A word of warning about sodium amytal: It reduces blood pressure and retards the pulse rate. It is, therefore, useful in cases of hypertension, but should not be used in cases of low blood pressure or if the pulse rate is slow. While I have had no cases of collapse with its use, it is a potential risk to give it in low-tension cases.

To complete the control of the patient, the bridle or superior-rectus suture of Elschnig, advocated by Elschnig[54, 59, 60], Lancaster[55], Gradle[62], King[69], Meyer[73], myself[3], and others, was used in nearly all of this series. It is a very important adjunct both to prevent the sudden upward jerking of the eye and also to assist in rotating the eye downward and so make it unnecessary constantly to urge the patient to "look down." Many cases of loss of vitreous have been prevented by its use and it is indispensable.

Other measures to prepare the patient for operation are so standardized and so generally accepted that no spe-

cial mention of them is needed. I have recorded these details because their use is debatable, and after trying a number of anesthesia procedures, it was found that the described routine gives the best complete control of the patient. These features together with the all-important "good section," are what make the intracapsular operation no greater risk than the extracapsular. They also make it unnecessary to employ a highly trained assistant. With this routine the ordinary self-retaining speculum was used, instead of the Green speculum, which was used in all cases prior to adopting this anesthesia routine*.

Flaps and Sutures

Sclerocorneal sutures have been advocated by Derby[74], Rabinowitsch[75], Lech[76], de Saint-Martin[77], Verhoeff[78, 79], and others, Verhoeff[78] having devised an instrument to hold the wound tightly while the suture is inserted. Lowell[80, 81], Spratt[82], Tieri[83], W. E. Lambert[84], Klauber[85] and Wolfe[71] have used the pocket flap. Spratt[82] and Wolfe[71] made the incision with a Graefe knife, the others with a keratome, enlarging it with scissors. Lambert[84] used a special blunt keratome to enlarge the incision. Lowell[81] has used a twin keratome, which makes a long incision which, being uncut in the middle, is completed with a blunt Graefe knife or with scissors. The unsevered bridge flap has been mentioned by Todd[86], Slocum[87], Amin[88], and O'Connor[89]. The Kuhnt or Van Lint flap, that is, a conjunctival curtain, dissected upward from the limbus and later pulled down over the corneal wound and attached with vertical sutures on nasal and temporal sides of the cornea, has been urged by Birch-Hirschfeld[90] and Tederici[91]. Van Poole[92] has used simple conjunctival sutures of human hair, inserted above and below to draw a curtain flap from above downward over the corneal wound with the sutures finally resting across the face of the cornea. Berens[93] has cut a large complete flap with the Graefe knife which he held in place with a running untied suture. Wolfe[94] has used a combination of the Derby-Verhoeff sclerocorneal suture and the Van Lint flap. Greeves[95] and many others have used complete conjunctival flaps with one or more conjunctival sutures.

I have tried several of the above conjunctival flaps, but never the sclerocorneal sutures. The Van Lint flap, was used thirty times in this series, and the Lowell-Spratt pocket flap four times. In forty-three cases a corneal or corneoscleral incision was made without any flap, and in the twenty-three remaining incisions a conjunctival flap was included of varying size cut with the knife, before removal, above the corneoscleral margin. This last procedure has now become our choice, all other flaps and sutures having been discarded. As advised by Doctor John Wheeler, the simplest way is the best. This type of flap, used by Barraquer and others, is sufficient to prevent the untoward effect of delayed healing of the corneal incision, which I have mentioned in previous papers.

In a number of cases, we have sutured the lids together, as practiced by Fisher[96], but this becomes a postoperative irritation and has not been used often. Of late I have been following Doctor Lancaster's[55] and Doctor Alfred Wiener's suggestion of molding a wet dressing to fit the eyeball; when dry it becomes a firm splint and prevents any muscular action of the upper lid.

Complications

Two eyes were lost from expulsive vomiting and intraocular hemorrhage, which may have been due to a too tightly drawn Van Lint flap, or else to morphine and scopolamine anesthesia, which we were using at that time. Meyer[73] lost four eyes from this cause, which he attributed to too large a retrobulbar injection. These two patients had no retrobulbar injection. Redslob[97] and Cusumano[98] also reported postoperative expulsive hemorrhage, and the latter suggested stimuli projected

* Author's Note:—Since completing this series I have been successfully using sutures for lid control as advocated by W. D. Horner[100].

reflexly through the vagus and sympathetic systems as the basic cause.

Vitreous changes observed by de Saint-Martin[99] and others did not occur in any of these cases and were not noted by Knapp[31] nor Castroviejo[4] nor by Barraquer quoted by Harrison[100]. In one case with a late severe uveitis, a fibrous vitreous developed, but in all other cases with vitreous opacities some opacities were present before operation.

Central scotoma discussed by Elschnig[101], who also quoted Birch-Hirschfeld, occurred in one of these cases but remained permanent because it was due to chorioretinal changes which had probably been present before operation. Another central scotoma in this series was due to postoperative macular hemorrhage.

Hambresin[102] noted loss of vitreous, iris prolapse, and vitreous opacities as the three serious accidents of intracapsular extraction. Loss of vitreous, I[103] have discussed elsewhere, and while it is undesirable it usually does less harm in intracapsular than in extracapsular operations. If a full iridectomy is performed, the iris almost never prolapses, certainly no oftener than in capsulotomy cases. While a round pupil is ideal it can be obtained only with a higher percentage of iris prolapses, and this would be the same in capsulotomy cases. De Grosz[104], while advocating the round pupil as ideal, also admitted that "ninety-nine percent good results are preferable to ninety-five percent beautiful results." Vitreous opacities do occur with uveitis and should not be presented as a special result of an intracapsular operation.

In brief, with the exception of loss of vitreous at the time of operation, with its associated more or less hammock pupil, no complications occurred in this series of cases that do not also occur in extracapsular operations. Barraquer was right when he said[105]; "unpleasant and dangerous sequelae are almost always avoidable and due to defective technic. The correctly performed complete operation is free from postoperative complications." This of course does not apply to late uveitis nor to retinal changes with hemorrhages and exudates associated with complicating renal or diabetic or other uncontrollable circulatory disturbances.

Derer's[106] contention that with intracapsular methods postoperative complications are more liable to occurrence does not agree with my experience.

Complications: Unavoidable

In each of the following cases, the patient left the table in excellent condition and after a good operative technique. As these bad results were largely due to uncontrollable circulatory disturbances, the intracapsular operation *per se* should not be blamed for them. The morbidity represented is high, but fortunately for several of them the other eye was operated on later with better result. One patient, not mentioned below, died ten days after operation from mesenteric thrombosis. His operation was perfect, the eye in excellent condition.

Enucleations, 5:

(2) Expulsive vomiting and hemorrhage twelve hours after operation.

(1) One year after operation to relieve constant pain. Found intraorbital cyst of black fluid. Hemorrhage or necrosis? Patient not diabetic. Had retrobulbar injection.

(1) Low mentality; squeezed badly at each dressing, finally prolapsing entire ciliary body.

(1) Severe diabetic. Had hemorrhagic retinitis and retinitis proliferans before operation. Late postoperative hemorrhage.

Postoperative hemorrhages, 6:

(3) Eyes enucleated—stated above.

(1) Severe diabetis: gangrene one foot, choroidal hemorrhages and anterior-chamber hemorrhage six weeks after operation. Vision light perception. Later died.

(1) Macular hemorrhage: central scotoma.

(1) Iris hemorrhage: after first dressing, again six weeks after operation following a sneeze. No untoward result.

Central scotoma, 2:
(1) Postoperative macular hemorrhage (high blood pressure).
(1) Chorioretinal changes affecting macular bundle, probably present before operation.

Sclerosing keratitis, 2:
(1) Final vision = 10/100
(1) Final vision = light perception.

Late uveitis, 3:
(2) Vision = light perception. Both of these developed secondary glaucoma.
(1) Final vision = 20/200

Iris Prolapse, 1:
(1) After violent sneeze four days after operation.
Final vision = 20/15

Complications: Avoidable

Cases 100: with suction 86; with forceps 14.
Ruptured capsule: with suction 8; with forceps 2.
Vitreous loss: with suction 12; with forceps 3.
More or less hammock pupil: with suction 15; with forceps 2.

Ruptured capsule: The operation then has become a capsulotomy procedure. This certainly always will occur more frequently with forceps than with suction. With a suitably large "section" and with proper application of the vacuum cup, ruptured capsules should not occur at all, and this is one argument highly in favor of the suction versus the forceps operation.

Vitreous loss: grows less with improved technique, but sometimes cannot be avoided, especially in prominent eyes, and in small, deep-set eyes with large lenses. In this latter type the vacuum apparatus appears to work better than the forceps because with it the center of the lens is pulled forward into the vacuum cup, which at the same time reduces the diameter of the lens, making it easier to extract.

Hammock pupil: usually follows any loss of vitreous. A better pupil follows tumbling the lens. All of these patients had full iridectomy either preliminary or combined.

Results after Ruptured Capsules:

Suction:
1. 20/25+3
2. Light perception (late uveitis)
3. 20/30
4. 20/40
5. 20/50+2
6. 20/20+3
7. 20/15+3
8. 20/20

Forceps:
1. 20/15+
2. 20/30+2Wass.++++: Vitreous changes before and after (divergent eye)

Results after Loss of Vitreous:

Suction:
1. 20/25+3
2. 20/25+
3. 20/15
4. 20/15+1
5. 20/40+2
6. 20/15+3
7. Light perception (old glaucoma)
8. 20/30
9. 20/15+
10. 20/40
11. 20/15+4
12. Light perception (high myopia, vitreous opacities, fluid vitreous, and choroidal changes present before operation.)

Forceps:
1. (very slight) vision = 20/15+
2. (very slight) prominent eye and high myopia, —13D. Vision = 20/30+
3. (moderate) small, deep-set eye with large lens. Vision = 20/100

In other cases the apparently poor results were actually splendid considering the material presented: e.g., one case, both eyes in this series, an old glaucomatous patient who had gone through an iridectomy and a trephine operation on each eye and for whom we thought that any soft lens matter following an extracapsular operation

would be disastrous, whose vision had been reduced to shadows, attained the vision of R. = 20/40; L. = 20/40 —2. Several very high myopic patients were included in this series in whom final vision ranged from 20/15 to light perception, according to the degree of myopic fundus changes.

Results, therefore, cannot always be computed on the basis of normal vision, but should be noted on the basis of improvement under the conditions involved.

erator will gradually work into the Elschnig intracapsular technique. As already stated, the usual self-retaining speculum is quite satisfactory and a specially trained assistant is not essential.

As to the Green operation[89, 107, 108]: As stated previously, capsules should seldom be ruptured once the technique has been mastered. In spite of the Lancaster anesthesia, it is more necessary to close the eye quickly than when undertaking forceps extraction; it is,

ACTUAL VISUAL RESULTS INCLUDING ALL CASES

86 Suction	20/15 and+ 30	20/15 to 20/20 11	20/20 to 20/25 8	20/25 to 20/30 5		20/40 10		20/50 4
	20/70 2	20/100 2	20/200 2	6/70 1	L.P. 5	Enucleated 5	Died before testing 1	
	20/30 and better 54 out of 86					20/50 and better 67 out of 86		
14 Forceps	20/15 and+ 6	20/15 to 20/20 2	20/20 to 20/25 1	20/25 to 20/30 3		20/70+ 1		10/50 1
	20/30 and better 12 out of 14					20/50 and better 12 out of 14		

Comment Comparing Suction vs. Forceps

Ten years ago I asked Doctor Arnold Knapp what he thought of the Green operation. His reply was "It is beautiful, but it will not last." Today, that is my reaction to the same question. It is not the operation for beginners, although its results are excellent and I have always enjoyed doing it.

To attack the question from the average surgeon's point of view: Many men would agree that a capsulotomy with the cystotome should be performed only of necessity and not from choice. To remove a large piece of anterior capsule with the Kalt or other capsule forceps is certainly better technique than to cut more or less of a hole with a cystotome, leaving behind all of the anterior capsule. Extracapsular operations only should be attempted by beginners; that is, they should learn to creep before they try to walk. Some day, after many such extracapsular procedures, the forceps will hold fast to the capsule and with a little pressure from below an intracapsular extraction will have been performed. That is, with the forceps used, the operator will gradually work into the Elschnig intracapsular technique. As already stated, the usual self-retaining speculum is quite satisfactory and a specially trained assistant is not essential.

As to the Green operation[89, 107, 108]: As stated previously, capsules should seldom be ruptured once the technique has been mastered. In spite of the Lancaster anesthesia, it is more necessary to close the eye quickly than when undertaking forceps extraction; it is, therefore, more hurried, and the after-toilet sometimes less complete. Hence the Green speculum is better than the self-retaining one because with it the eye can be closed without delay. These factors make a specially trained assistant very necessary. The special apparatus is expensive and too heavy to carry easily from one hospital to another. The pump, however, as criticized by some, does not get out of order and will run faithfully year in and year out if properly treated. My conclusion at present is that for the Greens, the McLeans, the Fishers and other highly skilled workers in this field the suction operation is excellent. For the average eye surgeon, it would appear that the Kalt or Arruga forceps offers a better opportunity for working into and developing the intracapsular operation.

Similar conclusions, namely, the excellence of the vacuum operation in the hands of those who have the skill safely to perform it, but the preference for the Török-Elschnig type with Kalt forceps for the average operators, have also been presented by Wright[20, 21], Post[16], Castroviejo[4], and McAndrews[13].

When one has once learned to do an intracapsular operation, which entails shorter hospitalization and results in a larger number of eyes having vision 20/15, with no soft lens matter to produce postoperative inflammation and no secondary membranes to be needled, he will always prefer to attempt this procedure in order to gain these benefits for each patient seeking his services.

As stated in previous reports of this experimental series, I wish to express my gratitude to Doctor Alfred Wiener for his helpful suggestions and hearty cooperation in permitting these operations to be performed in the Eye Ward of St. Luke's Hospital, and to Doctor Charles Littwin who has ably assisted me in all of these cases.

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SIGHT-SAVING CLASSES

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Any work, medical or educational, with the partially seeing child presupposes the cooperation of the ophthalmologist; his diagnosis, his treatment, his advice and his recommendations are essential to the success of any undertaking. The 455 sight-saving classes, representing 144 cities and 24 states, plus the District of Columbia, have been established in the United States for children whose vision in the better eye, after correction, falls between 20/70 and 20/200, and for those suffering from progressive eye difficulties. Of the 50,000 partially seeing children in the United States, only 6,000 are being given educational opportunities suited to their needs.

Because of widely differing opinions in regard to certain eye difficulties, such as myopia, educators are at a loss to know what is the best procedure. This exposition of the needs of partially seeing children, medical, educational, and psychological, presents to the ophthalmologist something of the history of the movement, its present status, and its possibilities for future development. Presented before the section on ophthalmology of the New York Academy of Medicine, February 18, 1935. This study was aided by a grant from the Ophthalmological Foundation, Inc.

The ophthalmologist and the partially seeing child

It seems advisable to present to ophthalmologists the subject of the education of partially seeing children, first, because the success of the special classes established for them is vitally dependent upon ophthalmologic cooperation, and second, because so many children who need this type of education are not receiving it. Of approximately 50,000 partially seeing children in the United States, only 6,000 are being given definite educational help suited to their needs. Miss Frances E. Moscrip, inspector of sight-conservation classes in New York City, states in her latest report[1] that although 89 sight-conservation classes (79 for elementary-school children and 10 for junior-high-school pupils) have been established in the five boroughs, there are 400 on the waiting list for whom no present provision can be made*.

In addition, in New York City no special educational facilities are available for partially seeing pupils in senior high schools. Because economic conditions are making it more difficult for the handicapped to obtain employment, a larger number of graduates from junior high school sight-conservation classes are entering senior high school. It is of concern to ophthalmologists to know how these young people are struggling to make adjustments which, in some instances, are almost impossible, in the attempt to maintain their scholastic standing in competition with students who have normal visual acuity.

The third and chief reason for presenting the problems of sight-saving classes to ophthalmologists is because widely differing opinions exist as to the advisability of placing children with certain types of eye affections in these special groups. Free discussion of these problems will help not only to acquaint the medical profession with the educational side of the question, but will also assist educators in determining what their future action should be.

History of educational opportunities for the partially seeing

A brief history[2] of the origin and development of educational opportunities for the partially seeing should form a valuable background for understanding the problems of the present day and should facilitate plans for the future. Franz von Gaheis of Austria in 1802 was the first to recognize that partially seeing children were misfits in schools for the blind as well as in schools for the normally seeing, and to suggest

* Since the report was issued, three additional classes have been opened in greater New York, making a total of 92.

that steps be taken to provide suitable educational advantages for such children. However, it was not until 1908 that James Kerr and Bishop Harman reëmphasized the importance of this idea and established a school for myopic children in England. Three years later, Redslob established at Strasbourg the first class for partially seeing children on the European continent.

Through the efforts of Edward E. Allen, superintendent of Perkins Institution for the Blind, the first sight-saving class in the United States was established in Boston in April, 1913. In September of the same year a second class was opened in Cleveland under the direction of Robert B. Irwin. These two classes became the forerunners of two different types of special education for partially seeing children in the United States. In one group of classes the children were educated as a segregated group, as suggested by Allen; the other classes followed the plan advised by Irwin in which the children did all their close eye work in the special classroom and entered into all other activities with their normally seeing companions in the regular grades. Over ninety percent of the classes of the present day follow the Cleveland plan, since it obviates the possibility of developing a social handicap through segregation. Such a cooperative program is feasible because both the normally seeing and the partially seeing follow the same school curriculum.

The number of sight-saving classes has increased from two, in 1913, to 455 at the close of 1934. These figures represent 144 cities and 24 states, the District of Columbia and the Hawaiian Islands. The fact that the number of these classes has continued to increase approximately at the same rate as in normal years is an indication that they are accepted as a part of the educational system.

Reasons for establishing sight-saving classes

Some of the reasons for establishing these classes are:

(1) To provide educational opportunities for children with such low visual acuity that they cannot profitably use the ordinary school equipment. This group includes those having a visual acuity of between 20/70 and 20/200 in the better eye, with the best correction of the refractive error obtainable with ordinary ophthalmic lenses. (In New York the highest visual acuity accepted is 20/50);

(2) To prevent, through judicious use of the eyes, deterioration that may occur under unfavorable conditions in progressive eye affections;

(3) To offer educational facilities to children having noncommunicable eye diseases in a regressive stage;

(4) To assist children with muscle and fusion difficulties who would be handicapped in the ordinary class by fatigue, loss of time, or inability to see because of the necessity for covering one eye;

(5) To make the work of the regular classes more profitable to normally seeing children because of the special facilities for those who require more than their proportionate share of the teacher's time and attention.

In regard to the first group (low-visioned children) there seems to be a fair unanimity of opinion that they are not only greatly benefited by the educational advantages offered by sight-saving classes, but that, probably, they will need these classes for their entire school life.

There is some difference of opinion as to the placement of children who may be considered borderline cases, particularly those with the minimum visual acuity (20/200). The question arises whether they should be taught in a sight-saving class or in a class or school for the blind. Although the decision in each case should be made by the ophthalmologist, we believe that it is usually advisable to place such a child in a sight-saving class and to give him a fair opportunity to see whether he can carry out his work advantageously there. If he cannot do so, he is recommended for placement in a Braille class or in a school for the blind.

Several schools for the blind in the United States accept children only on the recommendation of an ophthal-

mologist. In such schools, children with vision of 20/200 or better are found only because the ophthalmologist has decided that this is the best placement, chiefly because of the prognosis. Unfortunately, in some schools for the blind, children with considerable sight are accepted; in a few instances, even children with vision approximating normal have been found in such schools.

The entire question of placement is of concern to ophthalmologists who have the opportunity in clinics or in private practice to guide parents and educational authorities in making such arrangements and adjustments.

For children constituting the groups classified as regressive eye diseases or strabismus, the arrangements are more or less temporary; these children are returned to the regular grades as soon as their eye condition or their readaptation warrants this action.

The greatest differences of opinion arise in regard to the placement of myopic children because of the different theories of the etiology of myopia and divergent beliefs concerning the efficacy of preventive measures and treatment in retarding the progress of the condition. It will be recalled that the schools in England were established especially for this group. Recently Harman has reiterated[3] the opinion which led him to found the schools for myopic children. "The allegation that excessive eye work has a determining effect on the production or increase of myopia has been contested. Personally, I have no doubt of the injurious effects of prolonged, close eye work on susceptible children, and believe that this is a cause of and an aggravation to myopia. Also, I am convinced by such evidence as I have that the control of eye work is beneficial to myopes. There is ample evidence for this contention in our observation of the pupils in the myope or sight-saving classes."

The "Report of the Committee of Inquiry into Problems Relating to Partially Sighted Children[4]," which is the most comprehensive report that has appeared on this subject, gives careful consideration to the placement of myopic children, because it is realized that this is one of the most difficult problems. The conclusion of this report reads,

> Standards for selection of myopes.
> No hard and fast rules can be laid down, but it is desirable to formulate general principles in order to reduce divergences in practice. These principles are:
>
> I. If the eyes show fundus changes indicative of a serious condition of myopia, the child should always be admitted to a special school.
>
> II. In the absence of signs of such fundus changes the child should usually be admitted to a special school if:
>
> (a) after repeated examinations it is found that the myopia has been increasing steadily at the rate of more than 1 dioptre per annum;
> (b) after a period of slow rate of increase or apparent arrest it is found that there is a sudden rise in the rate of progress to more than 1 dioptre per annum.
>
> III. The actual amount of myopia should not be the sole factor in determining whether a child should be sent to a special school.
>
> IV. The age of the child must be taken into account. The younger the child the more serious are factors such as degree of myopia present and the rate of progress of that myopia. In doubtful cases the existence of a history of myopia in the family may be a deciding factor.
>
> V. Children with a visual acuity after correction of 6/24 or worse should be admitted to a special school, though the majority of these will probably fall within category I above.

In regard to the placement of any child in a sight-saving class, the British Committee and the American group interested in this problem agree that the decision, in each case, must be made by the ophthalmologist, and that close cooperation is essential among ophthalmologists, school medical officers, educational authorities, and parents or guardians.

Advantages of the sight-saving class

Naturally, before attempting to make decision as to the placement of children, the ophthalmologist will wish to know the special educational advantages of sight-saving classes. The sight-saving class offers:

(1) Special ophthalmologic supervision with arrangements for reëxamination at intervals determined by the

ophthalmologist and recommendations made by the ophthalmologist as to the use of the eyes;

(2) Individual instruction by a teacher who is trained to understand the nature of the child's handicap sufficiently well to enable her to adapt his work to his particular needs, and to instruct him in those principles of hygiene that will help him to safeguard his sight;

(3) Educational media that the child is able to see without undue effort: books in large, clear type; maps without unnecessary detail; pencils, chalk, paper, etc., that will enable clear writing; an abundance of eye rest material such as clay, plasticene, etc., and paper cutting, by means of which he may work out his creative ideas with as little use of his eyes as possible; typewriters with large letters whereon, by the touch system of typewriting, he may learn to do much of his preparation as well as his original work; help in reading assignments by his teacher or normally seeing fellow students; educational guides in the choice of courses and in the consideration of future occupations.

(4) Physical surroundings conducive to general health and, in particular, to eye health, such as excellent natural and artificial illumination with adequate light, well diffused, well distributed and well controlled to avoid glare; walls, ceilings and woodwork of good reflective value in dull finish to avoid reflected or contrast glare; hygienic seats and desks, also in dull finish, etc.

Psychologic reaction of the child with low visual acuity

In making his decision, the ophthalmologist will consider the psychologic reaction on the child of failure due to a lack of these special opportunities and, in this time of economic difficulties, whether such activities may mean the difference between a future asset or a liability to the community.

Other ophthalmologic problems

However, ophthalmologists are concerned not only with partially seeing children of school age. The preschool years and those following the formal school period are of equal importance. More attention is now being given to the welfare of young partially seeing children, through the activities of Miss Kathryn Maxfield, director of the Arthur Sunshine Home in Summit, New Jersey. Previously, the resources of this home have been extended only to blind children; the present plan is to give as much assistance as possible to both blind and partially seeing children of preschool age in their own homes, by training and encouraging parents to care for them.

Ophthalmologic supervision of partially seeing young people after school life is an exceedingly difficult problem to solve. Among the various methods being tried, the principal one is the institution of a follow-up system of pupils leaving sight-saving classes. However, no system has produced adequate results. Many teachers are trying to imbue their pupils with an appreciation of the necessity of continuing to have periodic eye examinations. Medical-social-service workers in hospitals and clinics are making every effort to emphasize periodic eye examinations; ophthalmologists are inspiring these young people while under their care with such confidence in their recommendations that at least some of these eye patients are willing to follow instructions to return to the clinics and private offices for reëxamination and further advice. It is of concern to ophthalmologists that only a few are thus safeguarded against possible blindness or partial loss of visual acuity which is preventable. A better and more inclusive system of diagnosis and continual supervision of conditions which may result in blindness must be devised.

Future of sight-saving classes

In all preventive activities, the most efficient person, because of his ability, finally works himself out of a job. This is exemplified by sight-saving classes. In the immediate future there should be an increase in this special form of education as a remedial measure. More classes should be instituted in cities to

care for those who at present cannot be given these advantages; there should be classes in consolidated schools and in teacher-training institutions to care for partially seeing children in small communities; county classes should be established where transportation facilities make these possible; help is needed for teachers in rural districts to enable them to care for isolated cases for which no other provisions can be made.

Provision should be made for continuing the education of the partially seeing in high schools and colleges because now many of them are discouraged by their inability to compete with their fellow students.

But the distant future should be freed from the necessity for this special education, (1) through the results of factors already at work, and (2) by those discoveries that will make further prevention of eye affections possible. Already much has been accomplished by the prevention of smallpox, diphtheria, and other diseases that, in the past, have been responsible for many cases of blindness or impairment of vision; the routine examination and treatment of the expectant mother will prevent many of those eye conditions that are the result of inherited syphilis. Advances in modern surgery will lessen the necessity of special educational advantages for many children.

Hand in hand with these preventive and remedial measures in the medical field must go educational advances: hygienic school environment for all children; classes that are small enough to permit individual instruction; more intelligent training of teachers so that they may realize the importance of health in educational procedure; more intensive education of parents in order that they may understand and appreciate the value of preventive measures and the necessity for early attention to any deviations from the normal.

Conclusions

Ophthalmologists are vitally concerned in the welfare of partially seeing children. This welfare includes educational facilities suited to their needs and ophthalmologic supervision in the preschool and after-school years, as well as during school life. The sight-saving class seems to offer the best present solution of the educational problem even though increased facilities are needed to care for approximately 44,000 children in the United States. However, it should be considered a remedial measure and unremitting efforts should be made to prevent eye conditions and diseases that at present necessitate remedial and educational measures.

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NOTES, CASES, INSTRUMENTS

A NOTE ON PREOPERATIVE EYE CULTURES

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The purpose of this note is to report the bacteriological findings in the conjunctivae of patients, pending eye operations. This study was undertaken to determine whether preoperative cultures will aid in forecasting the possibilities of postoperative infection*.

Methods

The method used in these investigations was briefly as follows: The patient was asked to look upwards; the lower lid was pulled down, and a sterile cotton swab brushed gently over the conjunctiva in the lower fornix, care being taken to avoid the lid margins and lashes. Two of these swabs were made for each eye cultured. Material thus obtained, was cultured in blood broth aerobically for 24 hours and anaerobically for 48 hours. Isolated colonies of the organisms present, if any, were then easily seen on the plates. From these, smears were made, if it was thought necessary.

Results

In this series, the total number of patients who were studied and later operated on, was 92. This included only the cases in which an intraocular operation was performed. Operations upon muscles, conjunctiva, lids and enucleations were not included. In six of the 92 patients studied, the culture produced no growth. In the 86 cases in which organisms were found, the following results were obtained:

Organism	No. of times found
1. Staphylococcus albus, nonhemolytic	68
2. Staphylococcus albus, hemolytic	10
3. Staphylococcus aureus, hemolytic	10
4. Diphtheroids (xerosis, etc.)	7
5. Bacillus coli	3
6. Staphylococcus aureus, nonhemolytic	1
7. Streptococcus viridans	1

It might be mentioned in this connection, that the methods used in these studies tended to suppress the growth of diphtheroids. B. coli was probably a chance contaminant, which was removed by the preoperative preparation.

It was the purpose of the investigation to determine whether a given organism was potentially dangerous rather than to place stress upon the exact identity of the organism. It was necessary, then, to select some criteria on which a diagnosis could be based. Therefore, it was decided that, so far as staphylococci were concerned, organisms which produced a definite hemolysis of the blood and those which produced a definitely discernible amount of pigment were to be considered pathogenic for the eye until proved otherwise.

The preoperative preparation of those patients whose cultures showed supposedly dangerous organisms did not differ from that of the others. This preparation, followed routinely at the Wilmer Institute, is begun on the night before the operation by clipping the lashes, following which the skin of the lids and face is washed with a solution of castile soap, and a drop of mild silver protein placed in the conjunctival sac which is then thoroughly irrigated with 2-percent boric-acid solution. The sac is then filled with mercuric bichloride ointment (1:10,000) and a sterile eye patch applied. The next morning the patch is removed and the eye irrigated every hour with mild silver protein and boric acid, until the time of the operation. All of the patients received this preparation without variation.

Of the 86 cultures in this series, 68 were diagnosed as safe for operation;

* This work was done while the author was a member of the staff of the Wilmer Ophthalmological Institute.

in 55 of these cases, the postoperative course was uncomplicated. In 13 of them, however, there was some inflammation of the eye following operation. These postoperative inflammations varied from mild cases of iridocyclitis, which cleared up under treatment, to definite intraocular infection. In one case panophthalmitis developed.

On the other hand, in 18 patients the cultures of the eye showed supposedly dangerous organisms. Of these, not one resulted in a postoperative inflammation, all the patients progressing satisfactorily.

It is very difficult to correlate these results. Of the 86 original cultures, 68, or 79 percent, were diagnosed as safe, and 18 or 21 percent, were diagnosed as dangerous. Of those diagnosed as safe, 55, or 80 percent, did not produce postoperative inflammation, and 13, or 20 percent, did produce complications after operation. Of those diagnosed as dangerous, 18, or 100 percent, did not result in any adverse postoperative sequelae. The most important point in this is that organisms which were diagnosed as dangerous produced not one inflammation, but on the other hand, 20 percent of those diagnosed as safe, did produce a postoperative inflammation.

The chief conclusion to be drawn from these statistics is that it is impossible to foretell with any certainty, by these methods, whether a given organism is dangerous. Provided the preoperative preparation of the patient and the operating technique are excluded, the reason for this must be that the criteria are not adequate. The investigation must, therefore, be extended.

It has long been known that certain strains of staphylococci are lethal for rabbits when injected intravenously. Burky's investigations suggest that rabbit pathogenicity is a guide to the pathogenic activity in human beings. Accordingly, the aerobic broth culture from 15 of the afore-mentioned 92 cases, was injected intravenously into healthy adult rabbits. Of these 15 cultures, five had previously been diagnosed as dangerous by cultural criteria, and ten had been diagnosed as safe. Of the five which had been diagnosed as dangerous, four or 80 percent, caused the death of the rabbits within one week, usually within 48 hours. A subculture was made of the blood of the rabbit in each case, in order to exclude the possibility that the rabbit had died from other causes. Of the ten which were diagnosed as safe, only one caused the death of the rabbit. This indicates that animal inoculation is an added means of determining the potential danger of a given organism.

In the four cases in which the rabbit died, one showed a postoperative inflammatory reaction and three showed a satisfactory postoperative course. In the 11 cases in which the rabbit did not die, no reaction occurred postoperatively. It would seem then, that a negative result in a rabbit is an aid to prognosis. However, this method is expensive, time consuming, of doubtful value, and cannot be put into widespread use.

Conclusions

The results obtained in these 92 patients indicate that routine preoperative cultures are of little value.

I am indebted to Dr. Earl L. Burky for aid and advice.

1001 David Whitney Building.

DOES ACCOMMODATION STIMULATE DIVERGENCE?*

JOSEPH I. PASCAL, M.A., M.D.
NEW YORK

In the May, 1935 issue of the American Journal of Ophthalmology is an article by Dr. Haessler showing the results of tests of the change of prism divergence at varying distances. The distances taken were 5 meters, 50 cm., 33 cm., and 25 cm. The results are charted in graphs and the conclusion arrived at by Dr. Haessler is "that the maximum possible divergence of the optic axes of the eyes is greater when the eyes accommodate for a short distance than for a longer one." From the findings the author concludes in essence

* From the Harlem (New York) Eye and Ear Hospital, Service Dr. Charles B. Meding.

that the impulse to accommodate is a stimulus to divergence or an inhibition to convergence.

This conclusion as all readers must know is diametrically opposed to the orthodox teaching regarding the relationship between accommodation, convergence, and divergence. The earliest investigators on the subject and all others since have found that stimulating the accommodation tends to stimulate and increase the convergence and on the other hand relaxing the accommodation tends to inhibit and relax the convergence, or if you will, tends to stimulate divergence. The close association which has been found between the accommodation and convergence which makes them change in the same direction, that is, increasing or decreasing together, is subject to a little leeway. It is possible to stimulate one function while keeping the other in abeyance, giving us the so-called relative amplitude of accommodation and relative amplitude of convergence. This dissociation, however, generally causes strain, as it is an unnatural working of the two functions.

Can we interpret the results of Dr. Haessler's tests in a way which will not upset all the established teachings on the subject of accommodation and convergence? It seems to me we can. All we have to do is to analyze the tests as made, primarily from the standpoint of the convergence, ignoring for the moment entirely the element of accommodation.

Let us take the case of a patient, emmetropic and orthophoric, fixing an object at five meters. We know that he can overcome from 4 to 8 prism diopters, base in.** On the model graph, figure 1, in Dr. Haessler's article, this is apparently taken as 4 prism diopters. His initial convergence is practically zero (one fifth of a meter angle), and he actually diverges to the extent of 4 prism diopters.

Now when the target is placed at 50 cm. and the patient fixates it, his eyes must converge 2 meter angles to do so. One meter angle, assuming a pupillary distance of 60 mm., is equivalent to 6 prism diopters. Thus the patient starts with a convergence of 12 prism diopters. When prisms, base in, are now placed before his eyes, he can in the interest of single vision relax some or all of this initial convergence. If he should relax all the initial convergence and then exert the absolute divergence shown with fixation at 5 meters, he should overcome 4 and 12 or a total of 16 prism diopters. That he generally cannot relax all this initial convergence, much less actually diverge under such conditions is shown by the fact that he usually overcomes only about 10 prism diopters, base in. In the model graph, figure 1, the amount shown is apparently 12 prism diopters.

When the target is moved still nearer, to 33 cm., and the patient fixates it, he starts with an initial convergence of 3 meter angles or about 18 prism diopters. If he should relax all of this and even exert the absolute divergence of 4 prism diopters he should overcome 22 prism diopters, base in. Generally he overcomes less. In the model graph, figure 1, he is shown overcoming about 18 prism diopters. When the target is moved still nearer, to 25 cm., the patient in order to fixate now must start with an initial convergence of 4 meter angles, or about 24 prism diopters. If he should relax all this under the influence of the base-in prism and even exert the 4 prism diopters of absolute divergence, he would overcome 28 prism diopters, base in. He generally cannot overcome so much, and in the model graph, figure 1, he is shown to overcome about 23 prism diopters.

The crux of the matter is that the greater prism divergence found at closer distances is due to the fact that at closer points of fixation the initial convergence corresponding to the distance can be forced to relax. And since the

** Dr. Haessler uses the term "centrad," though he uses the Greek letter delta (Δ) for the symbol. The latter symbol stands for prism diopters. The inverted triangle was the symbol for centrad, but neither trial nor prescription prisms are now made on any other system than prism diopters. The full name of the unit is rather clumsy and could be conveniently shortened to "prisopter." The old term, however, is being retained in this article.

closer the point of fixation the greater the initial convergence, the greater will be therefore the resultant prism divergence.

Taking the four distances chosen in the tests and the figures previously used, if the eyes could be made to relax convergence completely and even produce their full power of divergence, thus showing the maximum divergence possible at every point of fixation, we should get the following prism divergence: at 5 meters, 4 prism diopters; at 50 cm., 16 prism diopters; at 33 cm., 22 prism diopters, at 25 cm., 28 prism diopters.

We have so far ignored the element of accommodation. What effect does the accommodation have in these tests? The only effect it has is to restrain the convergence from relaxing so completely. It is for this reason that at distances closer than five meters we generally find less prism divergence than the amount corresponding to the distance of fixation plus the absolute divergence. It must be emphasized that in this prism-divergence test there are two opposing elements. One is the accommodation which tends to restrain relaxation of convergence. The other is the fusion faculty which tends to stimulate relaxation of convergence in order to retain single binocular vision. Where the object of fixation is large and not designed to necessitate exact focusing, the accommodation will relax along with the convergence to a considerable extent in response to the base-in prisms. The rest of the relaxation is produced by the fusion faculty in opposition to the restraint of the accommodation.

Furthermore, the extent of the prism divergence depends upon the rigidity of the association between the accommodation and convergence. As everybody knows there is a good deal of free play, the so-called relative amplitude between the accommodation and convergence. Where the association between the two functions is "tight," prism divergence will be less, because the restraint of the accommodation to convergence relaxation will more effectively overcome the fusional urge to convergence relaxation. Where the association between the two functions is "loose" the prism divergence will be greater because now the fusional urge to convergence relaxation will have little opposition. In fact sometimes all the initial convergence at every point of fixation may be made to relax. This variable factor, more than any other, accounts for the differences encountered in the individual graphs.

Summary

The well-established fact that the amount of prism divergence increases with the nearness of the point of fixation is entirely in harmony with the well-established fact that increased accommodation tends to produce increased convergence. The greater prism divergence at near is due to the presence of a greater amount of initial convergence, which is forced to relax by the fusion impulse, usually against the restraint of the accommodation. The graphs presented by Dr. Haessler to show that accommodation tends to produce divergence, even the 17 apparently troublesome graphs, can be explained with greater facility by the well-known variability in the intensity of the association between the accommodation and convergence, the so-called relative amplitude. The prism divergence is the resultant of two opposing forces. These are (1) the accommodation restraining relaxation of convergence and (2) the fusion faculty forcing relaxation of convergence.

500 West End Avenue.

CONCERNING THE RELATION BETWEEN ACCOMMODATION AND CONVERGENCE

ELEK JOHN LUDVIGH, PH.D.
BOSTON

In the May, 1935 issue of the American Journal of Ophthalmology, Haessler reports experiments and interprets the results as proving that "accommodation is a stimulus to divergence, or an inhibition to convergence," rather

* From the Howe Laboratory of Ophthalmology, Boston.

than a stimulus to convergence as is generally believed.

Haessler says, "However, if the act of accommodation is a factor in determining the resultant divergence of the visual axes, the divergence measured at various distances should be proportional to the fraction of the total accommodative power used at the distance at which divergence is measured." We can express this relationship more concisely as follows: Let D = divergence in centrads, A = total accommodative power in diopters and A_u = accommodation in use in diopters, then (1) $D = f(A_u/A)$. But the accommodation in use was measured by the distance of the object (although it may be noted that no precautions to insure accommodation on the object were reported), so that if d = the distance of the object in meters, then (2) $d = 1/A_u$. Substituting in (1) we have (3) $D = f(A/d)$.

The first problem which arises is that of defining D. The expression "maximum possible divergence of the optic axes of the eyes" is used. The reference position from which this divergence is measured is not stated. If the reference position is parallelism of the optic axes, it appears that absolute divergences of the order of 24$^{\Delta}$ were obtained when normal patients looked at the near point. I have not been able to obtain this result and it seems impossible. If, on the other hand, divergence is measured from the position which the optic axes would take for correct binocular fixation of the test object if the prism were not present, then (4) D = f (d) without considering accommodation at all. Then (3) D = f (A/d) would be true even if the accommodation used were held constant.

This general treatment is sufficient to show that no proof has been offered that accommodation effects divergence. Furthermore by examining the specific data presented we come to a conclusion opposite to Haessler's, namely that accommodation effects convergence. What appears to have been investigated is ordinarily called the "negative relative convergence" or abduction, and is measured by the strongest prism, base inward, which can be overcome when accommodation is held constant. That the negative relative convergence increases as the object is brought nearer is generally admitted. But this does not mean that accommodation reflexly effects divergence. For, suppose that divergence and accommodation were entirely unrelated, then the following table would represent the prism diopters necessary to produce binocular fixation of a near object at various distances when the eyes are in the position of maximum divergence. The figure for the latter is from Haessler's data in the only case for which he gives specific values. In the third column for comparison are the results obtained from Haessler's graph of that case.

PRISM DIOPTERS NECESSARY FOR FIXATION

Distance	Calculated	Haessler
5 m.	4$^{\Delta}$	4$^{\Delta}$
50 cm.	16.5$^{\Delta}$	12$^{\Delta}$
33 cm.	23.1$^{\Delta}$	18$^{\Delta}$
25 cm.	29.5$^{\Delta}$	23.5$^{\Delta}$

The fact that Haessler's values are smaller than those in the second column indicates that with Haessler's patient less relative divergence could be produced than would be expected if accommodation and relative divergence were entirely unrelated. This means that accommodation positively effects convergence, a conclusion opposite to Haessler's.

It is said that "the data readily explain the exophoria observed in presbyopia." No explanation is given, but presumably it would be as follows: The total accommodative power of a presbyopic subject is low. For any given distance he must, therefore, use a large fraction of his total accommodation. This results in greater divergence than if the total accommodative power were large. If, however, as Haessler's data really show, accommodation effects convergence, the simpler and commonly held explanation is available, namely: the accommodation used is less, hence less convergence is reflexly excited.

243 Charles Street.

SINGLE SUTURE RETHREADABLE NEEDLE*

JOSEPH L. McCOOL, M.D. and
C. ALLEN DICKEY, M.D.

The object of this communication is to bring to the attention of the profession the advantages of a rethreadable needle, designed to carry a single strand of suture material.**

There are other needles on the market carrying single sutures, but they cannot be rethreaded and by reason of their shape and caliber are not suitable for ocular surgery.

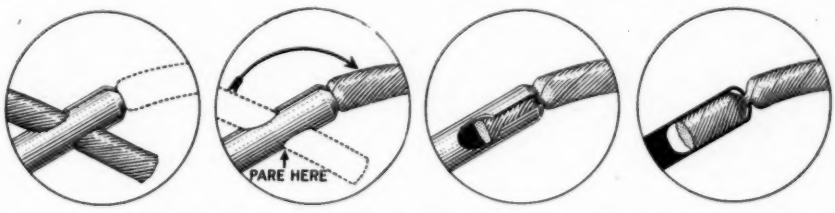

Fig. 1 (McCool and Dickey). The needle is threaded as illustrated. The last illustration is a phantom cut showing how the suture is held.

The needles which we are describing are made small enough to carry No. 1 twisted silk properly prepared with pyroxylin, 0000 catgut, fine dermal, and horsehair.

We use the No. 6 needle in suturing the conjunctival flap following a cataract extraction, in conjunctivoplasty, in repairing wounds of the conjunctiva and sclera, and in transplanting pterygia.

For all plastic work on the lids the No. 5 needle is small enough, although No. 6 may be used if one prefers a very fine needle.

In operations on the ocular muscles these needles are particularly useful because of the ease with which anchorage, either to the stump of the tendon or sclera, may be affected. There is one operation in particular on the ocular muscles which we believe is immeasurably simplified by these needles; namely, Jameson's recession. We have used the needle made from the design suggested by Dr. Jameson, which has a beveling in the eye, but even with this improvement there is an appreciable resistance offered by the double thread.

The diameter of the No. 5 Grüss needle, which we use in performing a recession operation, is about the same as a strand of 0000 catgut. With reasonable care it is comparatively easy to pass the needle through the superficial fibres of the sclera far enough to ensure firm anchorage. Inasmuch as the caliber of the needle and suture material is the same, no resistance is encountered in drawing the latter through the sclera.

Incidentally these needles are made in various sizes, which permits of their use in all surgical procedures. We have been using them for more than a year, and have found them so satisfactory that we have no hesistancy in recommending them to our confrères.

450 Sutter Street.

* From the Department of Ophthalmology, University of California Medical School.

** Such a needle was designed by Mr. F. K. Gruss approximately three years ago. It is now on the market and may be obtained from the Grüss Surgical Manufacturing Co., 163 Second Street, San Francisco, Calif.

SOCIETY PROCEEDINGS

Edited by Dr. H. Rommel Hildreth

SIOUX VALLEY EYE AND EAR ACADEMY

and the

SOUTH DAKOTA EYE AND EAR ACADEMY

January 22, 1935

Drs. J. J. Hompes and C. E. Robbins, presiding officers

Congenital aphakia

Dr. F. C. Millson (Sioux Falls, So. Dakota) presented a man aged 72 years who came to his office seeking an operation for a mature cataract of the right eye. On examination, the left iris was seen to be tremulous and there was a complete absence of the lens. Vision had always been very poor in this eye. There was no history of trauma, nor of any inflammatory disease of the eye. The patient was a farmer, and had never worn glasses. With a trial-case examination, vision in the left eye was brought up to approximately 20/20, and glasses prescribed. This case was unusual not only because of the entire absence of the lens and any sign of its previous presence, but also because of the fact that with a presumably congenital absence of lens in a man past 70 years of age, the vision could still be corrected to approximately normal.

Primary optic atrophy in juvenile diabetes

Dr. J. B. Gregg presented a brother and sister, now aged twelve and fifteen years, respectively. The boy, L. M., had first been examined two years ago, at the age of ten years. His vision had been poor for four years. At that examination he had a very definite bilateral primary optic atrophy with no retinal pathology. The vision was ability to count fingers with each eye. The fields showed marked concentric contraction without scotomata. The X ray of the sinuses, sella, and the optic canals was normal. The nose was normal; tonsils and adenoids had been cleanly removed. The Wassermann and Kahn blood tests were negative for the boy, also for the father, mother, and sister. There was no family history of blindness except in the one sister here reported, who had an optic atrophy and a severe diabetes. Repeated complete general examinations had been negative except for the diabetes. He had been on a diabetic diet and had been receiving insulin for the last two years. There was a raised renal threshold for glucose and repeatedly a blood-sugar content of 144 to 160 mg. per 100 c.c. of blood, with no sugar in the urine. Cooperation of the parents in his dietary restrictions had not been obtained, and as a result, examination at different times had shown marked glycosuria with a blood sugar of 120 to 333 mg. per 100 c.c. of blood. The boy's vision had gradually decreased to light localization in each eye.

The girl, H. M., was first examined four years ago at the age of eleven years. Vision had become poor one year previously. At the time of that examination, there was a definite bilateral primary optic atrophy with no retinal pathology, and the vision was 20/100 in each eye. The fields showed marked concentric contraction without central scotomata. Examination of the sinuses was negative; the throat was clean. X-ray of the sinuses, sella, and optic foramina was negative. The Wassermann and Kahn blood tests were negative. Repeated general examinations had been negative except for a severe diabetes. She had been on a diabetic diet for the last seven years and had been receiving insulin for the last four years. She had had several diabetic-coma episodes during the last two years. Her vision had gradually decreased, the discs had become more atrophic, until she could now only count fingers with each eye.

The boy's vision became poor at the age of six years, the girl's vision at the age of ten years. The eyes were exam-

ined for the entire family consisting of father, mother, and eight children, with normal findings in all except the two children here reported. The urine and blood-chemistry determinations were also negative for the members of the family other than these two reported. It was probable that if a series of blood-sugar examinations had been made for the boy, the cause of his optic atrophy would have been found a considerable time before sugar was found in the urine.

While it was uncommon to encounter ocular pathology caused by diabetes in juveniles, yet no other probable cause than diabetes was present in these two cases of primary optic atrophy.

Jay C. Decker,
Secretary.

CHICAGO OPHTHALMOLOGICAL SOCIETY

January 21, 1935

Dr. E. V. L. Brown, president

Present state of the European operative treatment for detachment of the retina

Dr. Arnold Knapp said that the operation for detachment of the retina which was now most favored in Europe was electrocoagulation. The coagulation was effected by surface coagulation or penetrating coagulation, and the guiding principle was to shut off the pathological focus and then to delimit this area by a curved line of coagulation extending from ora to ora. The various procedures were described in detail, including the new procedure of Coppez and Meesmann, which consisted in the use of a pyrometric electrode. This appliance permitted reading on a galvanometer scale the degree of heating to which the tissues were subjected during the coagulation. At the conclusion of the operation a number of punctures were made for drainage. In general it might be stated that deep penetration of the sclera was being abandoned and the coagulation was on the surface, or by superficial penetration.

Finally 45 cases were reported upon, of which 32 were healed, 4 improved, and 9 failures. The 9 failures included 2 cases of aphakia, 3 of total detachments, 1 very large tear, 1 thin sclera, and 2 cases of diseased vitreous.

Discussion. Dr. Sanford Gifford said that Dr. Knapp had certainly opened up a field in which every one was interested. He inquired if, in the case of the thin sclera, the surface coagulation had been followed by perforation as usual, and what means of perforation was preferred? Were there any other indications as to which cases were suitable for surface and which for deep coagulation? Were the Walker pins too long, or did they go too deep?

Dr. Arnold Knapp thought that surface coagulation was the only type that should be applied in the case of the thin sclera. If the exact technique of Dr. Coppez were followed, a definite amount of coagulation would be obtained. There should be minimal traumatism to the eyeball, as there was probably a pathologic vitreous. The question was, should perforation be done? That depended entirely upon the type of detachment. Those which were shallow, like those with many holes, were presumably due to a degeneration of certain areas of the retina, and would probably do better without perforation. Those with large balloon-shaped detachments usually had a single tear or hole, and sufficient drainage must be obtained to let out the subretinal fluid because the approximation of the retina to the choroid was essential. The safest electrode was Meesmann's as it coagulated and perforated at the same time; it was introduced just far enough to perforate the sclera. The future development of the operation would probably be along these lines. With a means of measuring the temperature of the tissue, the effect could be more accurately determined than when one had to depend upon the ophthalmoscope. Examination of patients during operation was not always so easy or so successful as could be desired and a method which showed that the requisite amount of current was being applied was best.

With the Walker pins he had had

no experience. His understanding was that they were introduced 1.25 mm., and that was about as far as they should be introduced. For surface coagulation they should be introduced only .5 mm.

Dr. Knapp replied to Dr. H. J. Smith that in some cases the primary result was often good, then gradually after a number of weeks a detachment recurred at a particular place, probably because the hole was not completely shut off. The hole must be surrounded, going from ora to ora, to prevent any leakage along the side. He used the following procedure: After entering the hospital, the patient wore the Lochbrille of Lindner, and was kept flat on his back unless the detachment was below, in which case of course he sat up so as to prevent the detachment from travelling upward and involving the macula. Sometimes the foot of the bed was raised. After operation the patient was kept in the same position: if the detachment was below he was kept flat for two weeks; if in the upper part, sometimes for three weeks. Then he was allowed up gradually, first for an hour or two every day until he had regained his strength. He stayed in the hospital from three to four weeks and continued to use the stenopeic glasses for another month at home. He was instructed to lie down every afternoon for three hours, besides getting up late and going to bed early, and was not allowed to work for another month.

In answering Dr. S. I. Kaufman, Dr. Knapp did not think that the tension gave any information as to the presence of a tear, but if it was low, there was probably a fluid vitreous which might escape.

With experience one could usually find holes, if sufficient time were given to the search. That meant an hour a day or every other day, three or four times on different occasions. Frequently the hole could not be found because the periphery of the fundus could not be seen. The best dilation followed the use of adrenalin or the new neosynephrin hydrochloride of Stearns. If one kept looking and remembered that statistics showed that most of the holes are in the upper outer or in the lower outer periphery, the hole could generally be found.

Dr. Knapp in reply to Dr. Vernon Leech said that of course many such patients had myopia, but that it was surprising in how many cases of emmetropia and hyperopia detachment developed. The same lesion was found in other conditions. The tuberculin test was always used if choroiditis were suspected. Many of these patients had been under prolonged tuberculin treatment. Some became stationary and might be regarded as benefited, but he had never seen a detachment cured by tuberculin.

He said that in the cases in which there were long tears, such as Dr. Michael Goldenburg described, which seemed to project over the nerve head, usually the tear lay between the equator and the periphery. They were very serious and difficult to handle.

Dr. Knapp answering Dr. Richard Tivnen, concerning contraindications, said that if the retina had been detached for a considerable length of time it was likely to be folded and degenerated. Total detachment, vitreous disturbance, arteriosclerotic change, and possibly hemorrhage occurring at the time of detachment were added. The aphakias might also be classed as such, although, with Dr. Gifford's experience, an operation should be tried. Then, of course, there were the very large tears which were difficult to manage. The only procedure in such a case would be to try to coagulate along the central part of the tear, from the place where the retina was comparatively near the underlying choroid, and in these large tears this meant going very far back for coagulation.

Conservative treatment was usually of no value to the patient. In Dr. Folk's case there was no tear, and it was perfectly correct to wait, but if a tear was found, operation should be performed. If not, the examinations should be continued.

In conclusion he said that the operation was not difficult, and every ophthalmologist should be prepared to do it. Assuming that his technique was correct and that he had studied his

cases thoroughly, he should obtain good results.

Robert von der Heydt

MINNESOTA ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

Section on Ophthalmology

February 8, 1935

Dr. J. S. Reynolds, president

Retinal detachment

Dr. C. N. Spratt (Minneapolis) presented a case of this condition. This was a favorable case for operation in that it was caused by an injury, the vision was practically normal, and the tear in the retina could be distinctly seen 10 mm. from the posterior pole and 30 degrees above the horizontal line in the superior temporal quarter. Eighteen Walker pins were used with the diathermy and the hole in the retina was cauterized with the electric cautery. Fortunately the localization was accurate and the patient showed the hole with the corresponding cautery scar on the sclera. The vision was 20/20 before operation and is 20/20 now.

Ocular manifestations of rosacea

Dr. James F. Brusegard (Red Wing) said that rosacea is a disease of the skin of the face and that unless there are ocular complications, disfigurement is practically the only symptom of which the patient complains. When ocular complications occur the face is usually severely involved. The ocular lesions result in a great loss of vision and for this reason are of great importance to the oculist. The general treatment is very important because an improvement in the rosacea of the face nearly always produces an improvement in ocular complications.

Dr. Brusegard presented a man aged 71 years, who was first seen in November, 1933. About a month previously the right eye had become red and at the same time there was a moderate amount of watery discharge from it. Two weeks later vision of the eye began to be impaired. The vision was hand movements at 18 inches; light projection was normal. Numerous small superficial areas in the cornea stained with fluorescein and one deep ulcer at "4 o'clock." There were numerous dilated capillaries and red papules in the forehead and cheeks. A large rhinophyma of the nose, the patient stated, had been present for over fifteen years.

The conjunctivitis was treated with silver preparations. Atropine and hot applications were used for the cornea and iris. During the next three weeks, the conjunctival injection gradually lessened. The cornea became clearer. The pupil dilated to 5 mm. Vision showed a slight improvement to hand movement at five feet. A month later, the lids became reddened and edematous. Numerous follicles appeared in the fornix and palpebral conjunctiva. These conditions were attributed to atropine; they rapidly disappeared after discontinuance of the drug. Scopolamine was substituted for the atropine. The deep ulcer in the cornea gradually healed.

During the next few months there were several remissions and exacerbations. In this period, several ulcers developed in the cornea; each ulcer occurred in front of the preceding one, closer towards the center of the cornea. On one occasion an ulcer was cauterized with 95 per cent phenol and it immediately became much worse. During one particularly severe exacerbation, the papules on the face developed into pustules and the dilated capillaries became more numerous. X-ray treatment was advised but this the patient refused. He was given 20 drops of dilute hydrochloric acid three times a day. During the first week the skin showed improvement but no changes occurred in the eye. The hydrochloric acid was continued for three weeks longer; no further progress occurred in either the skin of the face or the eye and it was discontinued. Daily applications of copper sulphate were then used on the conjunctiva. During the first week the discharge from the eye and the redness of the conjunctiva decreased slightly. Continuation of the copper sulphate produced no further improvement.

At the present time, the vision of the right eye was hand movements at three feet. There was a slight ectropion of the lower lid. The palpebral conjunctiva was thickened and of a uniform dull red color. A slight circumcorneal injection was present. A scar, 3 mm. wide at "4 o'clock," extended from the limbus to the center of the cornea. One long Y-shaped irregular blood vessel extended the length of the scar. The remainder of the cornea was irregular with numerous opacities in the substantia propria. The iris was somewhat thickened with markings indistinct. No opacities could be seen in the lens.

A method and instrument for localizing retinal and choroidal lesions

Dr. A. G. Athens (Duluth) described a flat, slender instrument made of silver in the form of an arc of approximately 12 mm. radius. The tip was fitted with a very small electric lamp which was covered with a metal hood. Over the source of the greatest illumination there was a 1-mm. aperture in the hood. The instrument was grooved along the center and contained sixteen .5-mm. perforations with their centers 1 mm. apart. The most distal of these perforations measured exactly 8 mm. on the arc from the aperture in the hood over the lamp. The instrument was designed to be used with the sclera exposed at the time of operation. It was applied to the sclera at any angle permitted by the exposure, while the observer followed the spot of light through the dilated pupil with the ophthalmoscope. When the light was seen to be directly over the lesion, an assistant marked, with an ordinary straight needle dipped in some dye, the site of two of the perforations several millimeters apart. The instrument was removed. As the distance from any one of the perforations to the light source was measured on the instrument, to localize the site of the retinal or choroidal lesion on the sclera it was now only necessary to connect the two points marked and extend the line the given number of millimeters from the last perforation. The sole object of marking the second perforation was to obtain a line of direction. The instrument had sufficient length to localize a tear at the macula.

The author stated that, although satisfactory results had been obtained with animals, the clinical value of the instrument had not yet been thoroughly proved. Certain obstacles were recognized. Chief of these was the problem of getting a sufficiently defined illumination when the retina was elevated several millimeters and the subretinal fluid dispersing the light. It was suggested that the instrument might prove useful in the diagnosis of choroidal tumors and other obscure lesions and in the localization of foreign bodies embedded in the ocular coats.

Walter E. Camp,
Secretary.

NEW ENGLAND OPHTHALMOLOGICAL SOCIETY

February 19, 1935

Dr. James J. Regan presiding

Calcium deposits in the conjunctiva

Dr. Charles Walker presented a 70-year-old man who came to the Eye Clinic for the first time in May, 1934, complaining of the sensation of a foreign body in the left eye. Some yellowish-white elevated deposits were found on the bulbar conjunctiva around the lower limbus. The patient was given 20-percent neutral ammonium tartrate for several months and later zinc sulphate. The symptoms improved and a good many deposits disappeared. A biopsy showed a moderate quantity of amorphous faintly basophilic material, not typical calcareous material. The specimen in block felt gritty with the tip of the scalpel. It was suggested that this treatment be used in similar cases in order to determine its merit.

Overaction of the inferior oblique

Dr. S. Rodman Irvine presented a 14-year-old boy, who had been operated on nine years previously for a convergent strabismus of 35 degrees. Appar-

ently no vertical deviation had been noted at that time. A tenotomy of the internal rectus and advancement of the external rectus had been done and at the time of discharge from the hospital the eyes were still somewhat undercorrected. He now showed esotropia, right hypertropia, and slight head-tilting to the right. The vision in each eye with a plus 2 spherical lens was 20/15. While fixating with the right eye (eye of preference) the left eye turned in about 10 degrees. While fixating with the left eye the right eye turned in 20 degrees and up 10 degrees. Extreme lateral motion to either side was slightly limited and elicited nystagmoid jerks. There was questionable limitation of motion in the field of the left superior rectus. The patient had no diplopia, so that the Maddox-rod tests were unsatisfactory. He had replacement but no stereopsis by Verhoeff's tests. The case was presented as one of convergent squint with a definite vertical component, in which no decision had been reached as to whether the left superior rectus or the right inferior rectus should be corrected.

Dr. White's opinion of this case was that the overaction of the inferior oblique was a secondary deviation to a paretic superior-rectus muscle. He recommended advancement of the external rectus of the right eye with coincident tenotomy of the inferior oblique at its insertion.

New method of tenotomy

Dr. W. Holbrook Lowell gave a preliminary report on an operation which had recently been tried out at the Infirmary. He performed the central tenotomy of Stevens as modified by O'Connor, and then cut the upper and lower borders of the muscle at its insertion, thus cutting the fibers that had been left uncut by the tenotomy. This followed the rule of Frank Todd and Bishop Harmon that "in order to get adequate lengthening all fibers must be cut." Dr. Lowell had had several excellent results with this operation.

Trygve Gundersen,
Recorder.

PHILADELPHIA COLLEGE OF PHYSICIANS

Section on Ophthalmology

November 15, 1934

Dr. J. Milton Griscom, chairman

Bilateral Duane syndrome

Dr. Willard G. Mengel said that a varied clinical picture is presented by this syndrome, some features being more constant and more marked than others; namely, abduction deficiency, retraction of the globe, and narrowing of the palpebral fissure. A large number of cases of the unilateral variety have been reported, but only 67 cases of the bilateral type had been found in the literature. In the bilateral variety, facial paralysis is present in about one third of the cases. The abduction deficiency has been accounted for, generally, by a fibrous cord replacing the external-rectus muscle.

His patient, a girl, was seen first when five years of age, with the complaints of slight crossing of the eyes and difficulty in turning the eyes to each side. The condition had been present from birth. There was no history of head injury, and no other congenital defect could be detected, nor any evidences of facial paralysis. There was complete limitation of external rotation in each eye. No diplopia was complained of at any time. The right visual field was viewed with the left eye by strongly adducting, and vice versa. It seemed difficult freely to rotate either eye inward. On attempted adduction the globe was retracted and the palpebral fissure narrowed. There was compound hypermetropic astigmatism of moderate degree. With correction normal vision was obtained. Operation was not advised.

Discussion. Dr. William Zentmayer mentioned the occurrence of this syndrome in three generations of the same family.

Sir Jonathan Hutchinson and his contributions to ophthalmology

Dr. Burton Chance said that Hutchinson was uncertain as to the course he

should pursue when he entered into practice in 1851. He had had a desire to become a missionary, and to fit himself for practice in Oriental countries he attended Moorfields for diseases of the eye and Blackfriars to learn of diseases of the skin. Besides attaching himself to the general clinics at the London Hospital and at the Hospital for Diseases of the Chest, in each of which he in time received staff appointments, he resolved to become a surgeon. From all these hospitals he learned to apply his knowledge to the service of each separately.

Hutchinson's clinical interests were omnivorous, and his literary output in each department of his industry enormous; no full chronological list of the reports, dissertations, and essays had ever been made.

At Moorfields he saw many persons affected by what he believed were the results of syphilitic disease, especially from inheritance, and on studying in each case the interior of the mouth, he noticed that the permanent teeth were misshapen and notched. Finding these dental deformities so constantly an accompaniment of the ocular symptoms, he ventured to believe that the deformities were caused by the same disease which had caused the corneal disease. He named this chronic interstitial keratitis.

As soon as a practical ophthalmoscope was devised he employed it without delay, and constantly in his studies of the syphilitic affections of the eye; the prognosis was given only after a knowledge of the fundus had been obtained. Many of his reports concerning intraocular affections had become possible only on observation with the mirror. By its use he, with Warren Tay, described the affection of the retina known as the Tay-Hutchinson disease. He noticed the iris reactions in fractures of the skull; the inequality of the pupils sometimes present had received the name of Hutchinson's pupil.

He gathered together a large number of persons whose defective sight he declared was due to overindulgence in tobacco. He described the eruption of herpes zoster ophthalmicus and its effect on the eye when the nasal branches of the nerve were involved. He noted the lack of enamel in the permanent teeth shown in persons with lamellar cataracts, especially in those who had a history of convulsions. Gout, which affected large numbers in Great Britain in the 60's and 70's, gave rise to serious disease of the eye. Hutchinson was especially interested in these cases, and so eager was he to explain the relation that the critics were inclined to suspect that Hutchinson "saw gout in everything."

Hutchinson was one of the original members of the Ophthalmological Society, succeeding Bowman, and the first of the Bowman lecturers. He was born in 1828 and died in 1913.

Blindness in onchocerciasis

Dr. Judson Daland stated that onchocerciasis is an endemic, progressive disease, with occasional exacerbations and remissions, occurring at all ages and in both sexes, and the duration might be twenty or more years. The cause of this disease is the Onchocerca coecutiens; millions lodge in the skin, but none in the blood. The sole transmitter is a female Simulium, or coffee fly, which in a few days converts a microfilaria into a young adult.

The disease occurs among Indians or on coffee plantations, and is restricted to an altitude of 1200 to 4200 or more feet, corresponding to the region occupied by the fly. The estimated number of cases of onchocerciasis in Mexico and Guatemala is 50,000 or more, and the disease is slowly spreading. The diagnostic symptoms in the order of importance are: microfilariae; tumors, 97 percent located upon the head; eosinophilia, averaging 37 percent; thickening and swelling of the ears, eyelids, and skin of the face; conjunctivitis; mild or intense photophobia; impaired vision or loss of vision; keratitis; iritis; and choroiditis. The percentage of cases of partial or total blindness varies in different localities in Mexico, Guatemala, and Africa. The average of 10 percent is much increased after the fifth year of the disease. On-

chocerciasis frequently coexisted with malaria, dysentery, Ascaris, pin and tape worms.

The symptomatology and pathology of onchocerciasis is chiefly due to the presence and movements of the parasite, and, in the opinion of the writer, is also in part due to toxins produced by adult worms, and the metabolism or death of microfilariae.

Many authors have observed, after excision of tumors, a sudden improvement in photophobia, vision, mental confusion, auditory hallucination or dysfunction of iris, together with a diminution in the number of microfilariae and eosinophils. Excision of all tumors is followed by arrest of the disease. Prophylaxis is economically impossible and treatment by drugs unsatisfactory. The microfilaria of a similar disease in Northwest Africa is morphologically and clinically identical with that of the American disease. The communication was based on the study of 50 cases of onchocerciasis in Guatemala.

Discussion. Dr. Damaso deRivas, of Philadelphia, added that this affection had been known for many years to exist in Central and North Africa, and that the parasite originally described as Filaria volvulus, and later as Onchocercos volvulus, inhabits the skin where it gives rise to a swelling or tumor of the chest, back, arms, or head. The embryo or microfilaria had been known to have been found in the subcutaneous tissue, but not in the peripheral blood.

A. G. Fewell,
Clerk.

CHICAGO OPHTHALMOLOGICAL SOCIETY

February 18, 1935

Dr. E. V. L. Brown, president

Changes in the refraction in children with convergent strabismus

Dr. E. A. Vorisek read a paper on this subject which is published in this issue of the Journal.

Discussion. Dr. Louis Bothman said that he had reported the results of his studies of a group of squint cases in the "Archives of Ophthalmology" of February, 1932. Among the 124 cases, 178 eyes had had an increasing hyperopia, 38 a decreasing hyperopia, and 32 had remained unchanged. The average increase in sphere (weaker meridian) was 1.07 diopters, and sphere plus cylinder (strong meridian) was 1.28 diopters. The refraction of these patients, all under six years of age, was tested several times under a minimum of 14 drops of atropine. The differences were between the original reading and the final reading.

Dr. Richard Gamble thought it interesting that Dr. Bothman found a greater increase in hyperopia before the age of six years than Dr. Vorisek did in an age group as high as 13 years. If one took the same series and followed the patients to the age of 21 years or later, probably one would find that the hyperopia decreased.

Strabismus in children corrected with refraction alone

Dr. G. Guibor read a paper on this subject which will be published in this Journal.

Discussion. Dr. J. L. Bressler said that in the Orthoptic Clinic at the Eye and Ear Infirmary, 88 percent of the 293 patients had convergent strabismus; 29 percent were alternating and 61 percent monocular; 10 percent were divergent, of which 5.5 percent were alternating and 4.5 percent were monocular. In reviewing the type of correction in these cases, it was found that 183 convergent and 22 divergent cases had records sufficiently complete to make a report. The patients with convergent strabismus showed simple hyperopia in 49 percent; compound hyperopia 42 percent; hyperopic astigmatism 2 percent; myopia 2 percent; emmetropia 5 percent. Those with divergent strabismus showed: simple hyperopia 18 percent; compound hyperopia 22.7 percent; hyperopic astigmatism 9 percent; myopia 4.5 percent; mixed astigmatism 18 percent; compound myopia 4.5 percent; emmetropia 22 percent.

In this Clinic it had been noticed that there had been fewer cases of myopic divergent or convergent stra-

bismus than in any other series reported. In a comparison with Dr. Guibor's series on straightening the eye with refraction only, if all the cases at the Infirmary Clinic were to be considered, the percentage would be very low. Of the 200 patients under treatment and observation, at least 75 percent had worn glasses for a considerable time before coming to the Clinic. In a comparison of treatment with lenses, his results were less than Dr. Guibor's, but he was inclined to think that he was more critical than Dr. Guibor. He did not consider an eye straight unless it was straight according to the gamma angle, 5 degrees in or out was not straight.

Dr. Robert von der Heydt stated that alternating squint was in a complex class by itself. Both eyes had good fixation, which was not true in most cases of concomitant squint. Suppression of one eye was automatically done by virtue of the fact that when the one eye was fixed, the image of the other usually fell on the nerve head of that eye or vice versa.

If the eyes failed to straighten after refraction, he used atropine to force the use of the nonfixating eye. Sometimes this was successful, but only when one could so blur the fixating eye with atropine that the squinting eye became the better seeing eye. Atropine was used in the good eye for the first ten days of alternating months; this would bring about three weeks of forced use of the other eye every two months. If the patients were older, homatropine was used from Friday evening to Sunday morning. In order to find out what very young children could see, six numerals the size of 20/80 vision were cut out of a calendar, and pasted on the sides of a block. The parents were told to play with the child and teach him the numbers and find out at how many feet away he could still correctly recognize the numbers.

Dr. M. L. Folk said that according to Dr. Guibor's figures, only one-half percent of the cases in his series were straight without glasses. That was certainly a low figure and brought up the question of proper refraction. One saw large numbers of patients whose eyes were straight after wearing proper glasses for a year or more. How much additional improvement did Dr. Guibor get with training over what he had been able to obtain with refraction and occlusion alone? From his figures, it seemed that the best he could get by fusion training was 15 to 20 percent, while Dr. Bressler succeeded in only 5 to 10 percent. Therefore, if it was a matter of so low a percentage, the training hardly seemed worth while. Dr. Folk's opinion was that if a patient were not corrected within six months or a year, operation should be performed, and then fusion training instituted.

Dr. Louis Bothman was interested in Dr. Schneider's remarks about prescribing the full-lens correction. In his own cases, he had prescribed full correction in all cases of convergent strabismus. In the study reported in the "Archives of Ophthalmology" in February, 1932, he had, among 85 cases, 44 in which the eyes were parallel with glasses; that was better than 50 percent. There were 25 in which there was less convergence with glasses than without, and 16 cases in which there was no difference with or without glasses. It was striking that there was, in 13 cases, after the patient had worn full correction for some time, a greater deviation without glasses than was present before the treatment began.

Dr. Dewey Katz asked about the subject of strabismus in relation to the disparity of the size of retinal images. Were there any cases of strabismus with aniseikonia in which the strabismus disappeared when the disparity in the size of the retinal images was corrected?

Dr. Sanford Gifford pointed out that Dr. Guibor's series should be considered as divided into the classes of low degrees of squint, below 15 degrees, with about 80 percent of success, and above 15 degrees, with about 15 percent of success from orthoptic training. The results in any series would depend upon how many cases of high degree and low degree were included, which would account for the different results in the separate series.

Dr. George Guibor (closing) said that the question as to when an eye was straight was difficult to answer. One must distinguish between the anatomic and the functional position of rest. The anatomic position of rest varied as much as 5 degrees or more at times. When taking measurements on the perimeter one could rarely be more accurate than within 3 degrees.

Dr. von der Heydt discussed the use of atropine and Dr. Allen asked about the use of bifocals. Squint of the accommodative type, straight for distance with glasses, was taken care of with full correction with an addition of +2.50 D. sphere before the atropinized eyes. With such bifocals children could attend school and did well in their studies. The amblyopic type of squint could be treated efficiently if the correcting glass before the fixing eye were weakened and atropine used to reduce the vision to that of the amblyopic eye. The type due to a disparity in the size of the retinal images could likewise be aided by a definite refractive routine. However, so little was known about this type of squint that no conclusive data could be presented at that time.

The criticism that orthoptic training was not efficient was not well taken, unless the critic had a definite routine which he employed. One should be open-minded unless he was able to determine the types which would be aided, because all cases, of course, would not be relieved by nonsurgical means. Lower degrees of squint would recover with glasses alone. An important factor entered to influence the recovery; that was, the accommodation as well as the fusion ability. A squint of 35 degrees of the accommodative type might recover by means of orthoptic training, and a muscular-type defect of only 10 degrees might fail to recover. One fact of interest should be emphasized: When a patient with squint who was under supervision suddenly failed to improve after showing some lessening of the squint angle and good fusion, atropine refraction might disclose that a change in the refractive error had occurred, and when the correct glasses were prescribed improvement would continue.

Robert von der Heydt,
Recorder.

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* Deceased.

SURGERY AND THE VITREOUS

Although upon superficial acquaintance the vitreous humor is one of the simplest structures of the eye, its origin and microscopic structure have given rise to a good deal of argument. For many years the opinion that it was derived from the mesoderm was rather widely accepted, but more recently it has been traced to an ectodermal tissue, the internal limiting membrane of the retina. The mesodermal cells occurring in the primary vitreous undergo absorption by the fourth month of fetal life, and there are no such elements in the final vitreous.

Since the vitreous is a "reversible gel," which may either absorb or give up water under varying chemical and physical conditions, its microscopic study becomes extremely difficult, and many of the details attributed to it histologically have been artefacts arising in the course of laboratory procedures. Observations of vitreous structure by means of the biomicroscope are not free from the objection that they record optical phenomena rather than anatomic facts. It has not even been possible to determine conclusively whether the hyaloid membrane is a true membrane or simply a condensation of the external layers of the vitreous.

Without cellular structure of its own, the vitreous, from the readiness with which it absorbs cellular products of other tissues, develops highly significant reactions. It may become opaque instead of transparent, it may swell so as to increase intraocular tension, it may exert traction upon the retina so as to cause retinal detachment, and there is even evidence that its presence and shrinking in the pupillary area may lead to displacement of the pupil. Particularly as bearing on retinal detachment and its treatment, Lindner and others believe that any interference, however slight, with the integrity of

the vitreous may lead to serious complications.

In an article which presents many excellent drawings of pathologic vitreous structure, Caramazza (Bollettino d'Oculistica, 1934, volume 13, page 1173) seeks to answer the following questions (1) What is the behavior of the vitreous after cataract extraction and in relation to surgical complications? (2) Are the changes which in greater or less degree are often encountered in the vitreous of aphakic eyes connected with the operative procedure or did they antedate it?

Among the thirty-one cases of cataract extraction studied with the biomicroscope, extracapsular were much more numerous than intracapsular extractions, so that the author may perhaps be regarded as having begun his investigation with a decided bias in favor of the older method.

Caramazza's general arguments in favor of retention of the posterior capsule as a barrier against vitreous hernia are shared by many ophthalmic surgeons, and criticisms of the intracapsular operation have been particularly based upon the greater risk of vitreous loss which it is supposed to involve. In Caramazza's descriptions, vitreous hernias are classified as simple or complicated according to whether the hyaloid membrane was intact or ruptured. The simple type was naturally more frequent after extracapsular extraction. Its character varied with the condition of the vitreous and with the size of the pupillary opening. Thus the author argues that intracapsular extraction should not be preceded or accompanied by total iridectomy but that only basal iridectomy should be resorted to in these cases.

For Caramazza's extracapsular extractions, opening of the capsule was performed by way of a large capsulectomy, so that a few cases of detachment of the capsule found after this operation were explained as possibly due to traction exerted by the forceps.

The vitreous hernias almost always occupied the upper part of the anterior chamber, being directed toward and sometimes adherent to the operative scar. Differing from Meesmann, Caramazza was unable to demonstrate appreciable resorption or modification of even fluid vitreous which had penetrated into the anterior chamber. Once exposed to the aqueous humor, the vitreous is easily permeated by hemorrhage or cellular exudate.

Because of the value of the posterior lens capsule as a barrier to vitreous hernia, and in spite of the brilliant results so often manifested by the intracapsular operation, Caramazza argues that the extracapsular operation, with or without iridectomy as decided for the individual case, but with the visual advantage conferred by a large capsulectomy, should remain the operation of choice for senile cataract.

W. H. Crisp.

LINDNER ON RETINAL SEPARATION

Since the formation of the secondary optic vesicle has been understood, it has been known that the retinal layer of pigment epithelium was as much a part of the retina as the neural layer, which often monopolized the name. In the normal retina there never was any adhesion or attachment between the two layers that become detached, in the so-called "detachment" of the retina. The two layers are held in contact by vitreous pressure and becoming separated, impair the function of the neural layer, which only remains perfect while it is closely applied to the epithelium. Hence "separation" is a better name for the condition than detachment.

Professor Lindner has long been interested in the separation of the retinal layers, and has closely followed the operations devised in recent years for the cure of retinal "detachment." His recent visit to America has brought his views to the attention of American ophthalmologists and they cannot fail to modify greatly their ideas and their treatment of this condition that so often has been a cause of hopeless blindness. To those who thought much of the problems of curing retinal separation, various possibilities regarding

the causes and control of the condition have seemed promising enough to be worth trying.

Lindner's experiment with an artificial vitreous, in a spherical flask of thin glass, was most convincing. Even one who had been familiar for years with the observations and views of Leber and Nordenson regarding "holes in the retina" and was still skeptical as to their importance, could not fail to be impressed with the tap that followed a few seconds after gently rotating the sphere 20 or 30 degrees. His other flask, with the tin foil to represent the retina, demonstrated how the simple rotation had a different, and in some ways, greater effect, than more violent shaking of it.

The above experiments, offering an explanation, prepared his hearers to give credence to his observations on the value of fixation spectacles in securing permanence for the replacement of the retina that had been obtained by operative procedures. They also suggested why the strict rest in bed, that sometimes was followed by complete replacement, often failed to be of any benefit.

Lindner's demonstrations of detachment of the vitreous, by a shrinking of the vitreous and the filling of the vacant space, not by "fluid vitreous," but by a different fluid exudate, suggests that prevention of retinal detachment may be entirely practicable; and that this kind of control is worthy of very careful trial and close observation. With this line of suggestion, our attention is turned to a new importance of the study and control of myopia. We begin to understand why retinal separation is so much more frequent in eyes that are myopic. Edward Jackson.

ETIOLOGY OF TRACHOMA

Voluminous is the literature on this subject, much of it inconsequential, but here and there a suggestion has been made as a result of laboratory research or clinical investigation that has narrowed the field and advanced our knowledge until now the answer appears to be almost at hand. The probabilities seem to have been cut down to three, with the third appearing less and less likely as work on the other two advances. These are a virus such as described by Julianelle at the American Association of Pathologists and Bacteriologists in June of this year and to be discussed further at the meeting of the Academy in Cincinnati, the inclusion bodies of Prowazek and Halberstaedter, described over thirty years ago and recently strongly advocated as causal by Thygeson, and lastly B. granulosis of Noguchi, accepted as the agent after extensive research by Olitsky and others.

The chief reason for the increasing doubt of the last-named as the cause is the work of Julianelle and of Thygeson, both of whom have shown the reproduction of a disease in animals with material which does not contain B. granulosis, and yet the disease is exactly similar to that produced by infecting with whole trachomatous material. In Thygeson's report in this issue, trachoma was transmitted by bacteria-free material from trachomatous individuals to a nontrachomatous person. The material used was rich in inclusion bodies and the experimentally infected eye soon showed enormous numbers of these bodies. On the face of it this might appear to be conclusive evidence that the inclusion bodies were the agents, except for the possibility that these bodies are secondary and that the primary agent is an invisible virus present in the material which also contains the inclusions.

This is indicated by the studies of Julianelle, who has been able to reproduce a disease in monkeys similar to that caused by the use of whole trachomatous material which is not only bacteria-free but also free from inclusion bodies. That this material contains a virus is evident from certain characteristic virus reactions which it causes. These will be described in Julianelle's paper before the Academy.

The exclusion of one or other of these two agents may possibly be accomplished by the use of various filters of standard-sized porosity which may eliminate one or the other of these two

bodies from consideration, or by some other method.

The long and excellent research of these workers deserves the sincere admiration and encouragement of our profession. Great credit should go to Thygeson for the difficult human experiment which he has conducted. The simple case report does not even hint at the legal, ethical, financial, and other physical problems entailed.

These reports give us reason for anticipating an early solution of this age-old problem. Lawrence T. Post.

COMPENSATION FOR EYE INJURIES

Ten years ago, after many months of exacting work, far more than anyone who has not struggled at a similar task would realize, the committee appointed by the Ophthalmic Section of the American Medical Association to study the question of compensation for eye injuries and formulate standards for evaluating loss of visual efficiency and tables for compensation brought in its report. These recommendations were approved by the House of Delegates of the American Medical Association in May, 1925.

So many factors are involved in estimating compensation that it is not surprising that on every element of the report, all do not agree; even the committee itself was not in entire accord on the final report. The ten years that have followed have, however, proved its value. It is wearing well and standing the test of time, as witness the fact that a majority of the states use the report as a basis for compensation though modified somewhat to conform to the exigencies of their respective laws. In a few of these states the modifications rather detract from than add anything of value to the original transcription. One state law, for example, does not permit the use of glasses in estimating distant vision for determining compensation following an accident, unless glasses were worn before the accident. This obviously means that an otherwise perfect posttraumatic aphakic eye is industrially blind.

The importance of the matter continually increases as workmen's compensation laws become more and more important and more and more widely employed with the increase of national paternalism. The members of the original committee still receive frequent requests for interpretation of the report, so it is of interest that one of the members is to repeat a course on the subject at the Academy meeting this month in Cincinnati. This will give an opportunity for those who so desire to hear an authoritative interpretation of the report and to receive answers to questions that have proved troublesome.

That no major change has been suggested during the past ten years is good evidence of the efficiency of the work done a decade ago, and the committee is to be sincerely congratulated.

Lawrence T. Post.

BOOK NOTICES

Ueber die primären Tumoren des Sehnerven und der Sehnervenkreuzung (Primary tumors of the optic nerve and chiasma). By Åke Lundberg. Inaugural dissertation, Karolinisches Institut, Stockholm, 1935. Paper cover, 164 pages, 28 illustrations. Distributed by Nordiska Bokhandeln, Stockholm. Price not stated.

This monograph presents the results of a painstaking research into the clinical and pathologic-anatomic features of primary tumors of the optic nerve and chiasma as well as an embryological investigation of the neuroglia within that nerve. The study is based on material comprising nine gliomata and one meningioma.

In addition the author has collected into one long table the essential features of 114 published reports of such cases, which he has gathered from the literature since 1912, thus bringing to date Hudson's review embracing the years 1833 to 1912.

The illustrations are for the most part photomicrographs of tumors but include as well schematic drawings, sketches of dissections, and roentgenograms. The voluminous bibliography

includes references to the European, Scandinavian, British, Japanese, and American medical literature.

Emma S. Buss.

CORRESPONDENCE

The Curran Iridotomy in Glaucoma

Editor, American Journal of Ophthalmology:

Recently, O'Connor[1] advocated the Curran iridotomy in cases of glaucoma with shallow anterior chamber, particularly before the drainage spaces have been closed by adhesions to the posterior surface of the cornea. I would not have considered it necessary to discuss this paper had not O'Connor stated that in my lectures on glaucoma at the Los Angeles Winter Course, in 1934, I had said that I refused to attempt the operation. In my lectures I said that in my experience, the Curran iridotomy has no more permanent effect than a simple puncture of the anterior chamber. I based this upon my experience with the iridotomy in sixteen cases of glaucoma which I have previously reported *in extenso*[2]. Theoretically the operation is unsound, as has been proved practically. In the sixteen cases reported, the iridotomy was performed as the primary operation thirteen times, and in three further cases, the operation was repeated for the second time. Five were cases of compensated (simple) glaucoma; in three of these, the tension was reduced for the first few days only, and subsequently, even under pilocarpine, never sank to the normal level; in the other two, the tension was never normalized after the primary effects of the puncture were past. In seven cases of incompensated (congestive) glaucoma, no effect beyond that of the primary puncture was obtained in five; in two, the tension under pilocarpine remained near the normal limit for a few weeks only. In a case of hydrophthalmos (child of 9 months), there was no more effect than a simple puncture of the anterior chamber. After a few more failures, I abandoned the operation on account of its uncertainty, especially in comparison with cyclodialysis in compensated glaucoma and my own iridectomy *ab externo* in incompensated cases.

O'Connor's paper does not justify the authoritative tone that he uses, for he does not give the statistics of any of his cases. He emphasizes only that his experience in *about* 40 operations "parallels and confirms all of Dr. Curran's claims" and later on, "the operation can be repeated with benefit, at times. . . . " The period of his observations does not seem sufficient, for in his own words "the permanence of results is hard to determine because of the frequency with which patients are lost track of by change of residence, death, or going to other attendants." O'Connor reported one of his cases as "a chronic simple glaucoma with moderately severe acute symptoms." There is no such thing as a simple glaucoma with acute symptoms. The characteristic of simple glaucoma is the absence of all congestive or acute symptoms[3].

In my previously mentioned paper, I showed that the basic idea of the Curran iridotomy is questionable. According to O'Connor, the operation balances the pressure behind and in front of the iris, thus deepening the anterior chamber and opening the drainage spaces of the angle. A marked difference in pressure behind and in front of the iris is impossible as long as the circulation of the aqueous through the pupil is intact; consequently, only where a circular synechia (seclusion of the pupil) prevents such circulation is a radical difference in pressure on the two sides of the iris possible. In such cases, a perforation of the iris such as Curran performs was done by Duddel in 1729 and by Bowman in 1865 and finally by Fuchs to whose name is attached the method of iris transfixion. The whole question of the etiology of glaucoma is much more complex than a mere difference in pressure on the two surfaces of the iris, a matter that was discussed at length by Czermak and more recently in my own work on the pathologic anatomy of glaucoma[4]. In every case of glaucoma with shallow anterior chamber, the *obstruction of the angle* by the iris is the *cause of the attack*. Only in

compensated (simple) glaucoma with deep anterior chamber does the angle seem to be free, and not always then. The complexity of the glaucoma question can be recognized from a perusal of the recent work of L. Mueller[5] and of Evans-Jameson[6].

So it would seem that O'Connor's indications for the Curran iridotomy are not even well chosen—"only in those cases that have a shallow anterior chamber and, in these, before the drainage spaces have been closed by adhesions to the cornea." I wonder how O'Connor can determine the presence of such adhesions clinically, for the Salzmann method of ophthalmoscopy of the angle of the chamber is impossible with a shallow chamber, as is the examination with the slitlamp and the Koeppe contact glass. The very few cases of fresh glaucoma that have been examined anatomically do show such adhesions, but when they form is still a matter of conjecture.

The communication between the anterior and posterior chamber through the transfixion of the iris is not the reason for the lowering effect, temporary as it may be, upon the intraocular tension. That effect is due primarily to the simple puncture of the eyeball and secondarily to the irritation of the iris. The recent work of Hamburger of Berlin has proved that iris irritation results in a lowering of the intraocular pressure for a short period of time. This fits in with O'Connor's statement that "after an iridotomy it is essential . . . to be on the lookout for quiet iritis . . . " It is a well-known fact that many various operations upon the glaucomatous eye will tend to lower the tension, sometimes temporarily and sometimes permanently, without our knowing why. This fact accounts for the multiplicity of glaucoma operations that spring into being, are utilized for a short time, and gradually fade into the discard. The only really satisfactory operations are those that control the pathological symptoms in the majority of cases. In my opinion, an operation does not suffice which "permits control of the disease by miotics in ordinary strength," with which O'Connor declares himself content.

Signed
Prof. Dr. A. Elschnig.
Marienbad, Czecho-Slovakia.

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ABSTRACT DEPARTMENT

EDITED BY DR. WILLIAM H. CRISP

Abstracts are classified under the divisions listed below, which broadly correspond to those formerly used in the Ophthalmic Year Book. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is only mentioned in one. Not all of the headings will necessarily be found in any one issue of the Journal.

CLASSIFICATION

1. General methods of diagnosis
2. Therapeutics and operations
3. Physiologic optics, refraction, and color vision
4. Ocular movements
5. Conjunctiva
6. Cornea and sclera
7. Uveal tract, sympathetic disease, and aqueous humor
8. Glaucoma and ocular tension
9. Crystalline lens
10. Retina and vitreous
11. Optic nerve and toxic amblyopias
12. Visual tracts and centers
13. Eyeball and orbit
14. Eyelids and lacrimal apparatus
15. Tumors
16. Injuries
17. Systemic diseases and parasites
18. Hygiene, sociology, education, and history
19. Anatomy and embryology

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6. CORNEA AND SCLERA

Sorsby, A., Wilcox, K., and Ham, D. **The calcium content of the sclerotic and its variation with age.** Brit. Jour. Ophth., 1935, v. 19, June, p. 327.

This study is illustrated by tables and graphs and a description of the methods of investigation. Calcium is a factor of some significance in the human sclera, but compared with muscle the latter is not excessively rich in calcium. In the cat calcium was found to decrease progressively from birth until adult life, and subsequently to rise with increasing age. In man the calcium content of the sclera rises slowly till about the age of thirty years, and more abruptly after that, in marked contrast with the progressive decrease with age given by other observers for most other tissues. The possible significance as to myopia and glaucoma is indicated.

D. F. Harbridge.

Thomas, Tudor. **Corneal graft.** Trans. Ophth. Soc. United Kingdom, 1934, v. 54, p. 451.

The author showed one of his fourteen human cases of successful corneal graft. He defines a successful corneal graft as one where the graft retains some clarity and there is definite improvement in vision.

Beulah Cushman.

Tichomirova, A. **Corneal sensitivity in keratitis.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 3, p. 356.

Tabulated findings in twenty-six cases of syphilitic parenchymatous keratitis and in twenty cases of deep tuberculous keratitis show that in both diseases corneal sensitivity is lowered in proportion to the severity of the involvement, particularly in the infiltrated areas. Unlike leprous or malarial keratitis, these diseases do not show lowered sensitivity in the uninvolved fellow eye. In parenchymatous keratitis the sensitivity rises with therapy and with improvement in the ocular symptoms, but in tuberculous keratitis it remains permanently reduced.

Ray K. Daily.

Tovbin, B. **The use of carotin in corneal transplantation.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 3, p. 352.

Three cases of corneal transplantation were treated with daily instillations of carotin. After experimental transplantations in two guinea pigs, one of them was treated with carotin. The carotin did not prevent opacification or vascularization of the transplant, but it kept the transplant transparent for a long time. Two to three minutes after instillation of the carotin the transparency of the transplant appeared to be increased.

Ray K. Daily.

Velter, C. **The results of the first series of partial corneal transplantations in the eye clinic of the Odessa Medical Institute.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 3, p. 419.

This is a detailed review of the technique used, the postoperative course, and the final results of 106 operations. The best optical results are obtained in opacities retaining some corneal elements, as after parenchymatous keratitis. Cicatricial opacities should have corneal grafts preceding the transplantation. Filatov's celluloid protector should be used to avoid injury to the lens and loss of vitreous. In extensive adherent leucomas, the iris or lens should be freed before the transplantation, and during the period of opacification of the transplant autohemotherapy, protein therapy, and osmotherapy are effective.

Ray K. Daily.

Wright, R. E. **Corneal grafting—reparative and optical.** Brit. Jour. Ophth., 1935, v. 19, June, p. 341.

In an experimental operation for corneal ulcer with descemetocele and fistula the author took a 2-mm. corneal disc with a bevelled edge and transplanted it with entire success as a reparative procedure but with failure optically. This experience suggested that anterior synechiae are not a contraindication. Large circular grafts, 9 mm., may be used with as great ease as small ones. An eye blind of glaucoma is capable of furnishing a graft. (One illustration, two case records.)

D. F. Harbridge.

7. UVEAL TRACT, SYMPATHETIC DISEASE, AND AQUEOUS HUMOR

Archangelski, B., and Churgina, E. **The relation between dispersion of pigment epithelium and the dilator of the iris.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 3, p. 314.

The object of this study is to explain the rigidity of the pupil relative to mydriasis found in some senile eyes. The degree of dilatation with atropin was studied in sixty-seven cataract patients between the ages of forty-nine and seventy-eight years. Then the eyes were studied with the slitlamp, and the piece of iris excised in the iridectomy was examined histologically. As a result of these studies the authors conclude that the failure of the pupil to dilate is proportional to the degree of pigment dispersion of the iris, and is due to lack of function of the dilator muscle, the nuclei of which are situated in the anterior layer of the pigment epithelium of the iris. In cases of destruction of the posterior pigment layer, as in diabetes, the pupil retains its capacity for maximum dilatation. When the anterior pigment layer is destroyed, as shown with the slitlamp by transparency of the iris, the pupillary reaction becomes limited. Histologic study confirmed these observations by showing that pathologic changes in the dilator muscle went parallel with pathologic changes in the pigment epithelium, while the sphincter muscle remained intact. (Illustrations.)

Ray K. Daily.

Biozzi, Giuseppe. **Circular folds in the posterior layer of the iris, a new slitlamp finding.** Klin. M. f. Augenh., 1935, v. 94, May, p. 646. (Ill.)

Two cases are reported in persons of seventy-nine and seventy years. As senile changes two systems of stripes were observed in the ectodermal stratum of the iris. The radial stripes consisted of dark brown lines radiating from the sphincter to the periphery. The circular stripes, in the epithelial layer of the iris, took the form of concentric brown circles. Their anatomic basis must have been the circular system of folds of the posterior surface of the iris at the level of the pigment epithelium. C. Zimmermann.

Bryn, Arne. **A case of chronic miliary tuberculosis.** Klin. M. f. Augenh., 1935, v. 94, May, p. 643.

A man of thirty-two years, suffering from chronic miliary tuberculosis of the lungs, diagnosed by roentgenograms, developed successively tubercles of the irises of both eyes, leading in the right eye to secondary glaucoma. It was cured by iridectomy, including the largest tumor. Pirquet's reaction is

negative in acute and chronic miliary tuberculosis. Although many cases of chronic miliary tuberculosis with favorable termination have been reported, the prognosis in this case was still uncertain. C. Zimmermann.

Charamis, J., and Sfalagako. **Epithelial cyst of the iris.** Arch d'Opht., 1935, v. 52, March, p. 167.

The authors report a case following combined cataract extraction. A cyst of the anterior chamber extending through the wound extraocularly was noted on the twenty-fifth day. About two months later it was excised in toto, the fluid escaping only when the attachment to the iris was cut. The wound edge was cauterized with the thermocautery. Microscopically the cyst was epithelial with a real cystic cavity. Derrick Vail.

Cogan, D. G. **Uveoparotid fever.** Amer. Jour. Ophth., 1935, v. 18, July, pp. 637-640.

Fuchs, A. **The surgery of iridocyclitis.** Proc. All-India Ophth. Soc., 1933, v. 3, p. 19. (See Amer. Jour. Ophth., 1934, v. 17, Sept., p. 868.)

Goebel. **On the etiology and therapy of sympathetic ophthalmia.** Zeit. f. Augenh., 1935, v. 86, June, p. 204.

The injured enucleated eye of a child of nine years in whom sympathetic ophthalmia had developed was sent to Meller for culture, and tubercle bacilli were found. The author suggests a hydrocyanic-acid compound to be given at regular intervals, day and night, on the ground that a mature tubercle is an entirely anemic structure, and that the tubercle bacillus must die if deprived of its oxygen supply. In affections of retina and choroid he also uses retrobulbar injections of adrenalin.
F. Herbert Haessler.

Kiseleva, E. **Tuberculin in the treatment of tuberculous lesions of the anterior segment of the eyeball.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 3, p. 373.

Graphs record the improvement in visual acuity of twenty-five cases of tuberculous keratitis and twenty-seven cases of tuberculous uveitis, treated with tuberculin. Ray K. Daily.

Kotliarevskaja, C., and Gochban, B. **Tuberculin in the treatment of tuberculous choroiditis.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 3, p. 368.

Graphs record the visual improvement of twenty-nine patients with tuberculous choroiditis, treated with tuberculin. Ray K. Daily.

Mata, P. **My experience with autohemotherapy in the anterior chamber in treatment of tuberculous iridocyclitis.** Arch. de Oft. Hisp.-Amer., 1935, v. 35, May, pp. 270-273.

The author has had successful results in eleven cases of tuberculous iridocyclitis treated according to the method of Schieck—injections of the patient's blood into the anterior chamber. According to the author the treatment is particularly useful for accelerating resorption of deposits at the posterior surface of the cornea. (1 illustration.) R. Castroviejo.

Meller, Joseph. **Tuberculosis and its relation to spontaneous, posttraumatic, and sympathetic ophthalmia.** Trans. Ophth. Soc. United Kingdom, 1934, v. 54, p. 467.

Meller prefers the Mantoux intracutaneous test for tuberculin to the subcutaneous test. Positive blood cultures were found by Löwenstein's method in fourteen percent of 132 patients with spontaneous uveitis. Blood cultures were positive in eight out of forty cases of posttraumatic iridocyclitis. The author advises taking the blood at the outbreak of the iridocyclitis or when relapses occur. He found the tubercle bacilli in the necrotic pigment epithelium in one case, and not in the diseased uveal tissue. Tubercle bacilli were found in the spinal fluid in a case of acute retrobulbar neuritis with multiple sclerosis.
Beulah Cushman.

Sverdlov, D. **Free cysts in the anterior chamber.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 3, p. 404.

In a man of twenty years the cyst was discovered when he came for treatment of a corneal erosion caused by a blow with a piece of wood. The cyst was 2 by 1.75 mm. in size, was free, and lay at the bottom of the anterior chamber. The eyeball was otherwise normal, and vision was normal. The author believes that the cyst developed from the posterior pigment layer of the iris or ciliary processes, was torn loose, and was brought into the anterior chamber by movements of the head.

Ray K. Daily.

8. GLAUCOMA AND OCULAR TENSION

Arkin, W. **Sclerencleisis. A new fistulizing antiglaucomatous operation.** Klinika Oczna, 1935, v. 13, pt. 1, p. 59.

The operation, the chief merit of which is technical simplicity, consists in introducing into the anterior chamber two thin scleral flaps attached at the limbus, to keep the scleral wound partially open. This may be combined with peripheral or complete iridectomy. (Illustrations.) Ray K. Daily.

Bakly, M. A., and Barrada, M. A. **Ophthalmomalacia.** Bull. Ophth. Soc. of Egypt, 1934, v. 27, p. 101.

A case of intermittent ophthalmomalacia is reported in which temporary adhesion between the iris and the back of the cornea arose from the decreased tension. The literature on hypotony is briefly reviewed.

Edna M. Reynolds.

Eleonskaia, B. **Pathology and pathogenesis of congenital hydrophthalmos.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 3, p. 330.

An irritable, painful, and blind eye was enucleated in a child of three and one-half years. On the basis of the pathologic findings the author concludes that the hydrophthalmos in this case was caused by intrauterine uveitis with secondary changes in the filtration area of the anterior chamber. (Photomicrographs.)

Ray K. Daily.

Fradkin, M., Levina, L., Sherishevskaja, L., and Utkina, K. **Diathermy of the cervical ganglia in glaucoma.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 3, p. 302.

The effect of diathermy of the cervical ganglia on ocular permeability was studied on guinea pigs, by means of intravenous injections of sodium rodonate and examination of the aqueous humor for its presence fifteen minutes after the application of diathermy and six hours later. The immediate effect of the diathermy was increased vascular tonus and increased permeability. This was followed by a secondary phase of diminished vascular tone and diminished permeability. A graphic report of the clinical effect of cervical diathermy on intraocular tension in thirty-three cases of chronic glaucoma demonstrates the periodicity of these two phases, and fails to confirm a favorable effect of this treatment in glaucoma. Ray K. Daily.

Granadickam, G. J. **Iridencleisis in glaucoma.** Proc. All-India Ophth. Soc., 1933, v. 3, pp. 62-75.

The author compares the results in chronic glaucoma after Elliot's trephine operation with those after iridencleisis. He dislikes the Elliot operation because of late infections, occasional closure of the trephine opening, and risks to nutrition of ciliary body and lens. He reports details of 52 out of 64 cases operated on in 22 months, and describes the technique of Holth and Gjessing with modifications. Results from iridencleisis were best in chronic noncongestive glaucoma and next best in moderate congestive types. The author advises iridectomy in acute and subacute types and prefers trephining when glaucoma is associated with cataract soon to be removed.

Lawrence Dunlap.

Jufa, H. **Thermosclerotomy in glaucoma.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 3, p. 311.

A modification of Fiore's thermosclerotomy was performed on thirteen cases of decompensated glaucoma, normal tension being obtained in twelve cases; and on five cases of absolute

glaucoma, normal tension resulting in three. The effect on visual acuity and fields was equally good. The operation consists in entering the anterior chamber through the limbus with a thermocautery, and covering the fistula with a conjunctival flap. The effect is due to the permanent fistula and partial atrophy of the ciliary body caused by the heat. Ray K. Daily.

Kurz, Otto. **The pathogenesis of glaucoma without increase of tension.** Arch. f. Augenh., 1935, v. 109, April, p. 108.

The author describes seven cases of glaucomatous excavation which in spite of all provocative procedures never showed increase of tension. X-ray examination revealed the presence of sellar bridges or calcified tentorial insertions in four cases, and of calcified internal carotid arteries in two other cases. In one case, where the roentgenograph was negative, the author assumes that the excavation was of angiospastic origin, for although no spasmodic retinal vessels could be detected with the ophthalmoscope the anamnesis indicated that the patient had suffered from angiospasm, migrain, and Menière's syndrome. R. Grunfeld.

Mukerjee, S. K. **Further observations on glaucoma as a result of epidemic dropsy.** Proc. All-India Ophth. Soc., 1933, v. 3, pp. 55-61.

The author reported 300 such cases in 1930 and now adds 191. The attacks conform to the clinical type of subacute glaucoma with the following exceptions: anterior chamber normal or deep, pupil normal or only moderately dilated, early appearance of halos around light, moderate congestion, cupping of the disc little more than physiologic. The average tension was 70 to 100 mm. (McLean). Tension spontaneously decreased with disappearance of the symptoms of epidemic dropsy, but glaucomatous changes progressed and the eye took on the characteristics of chronic simple glaucoma. The arterial constriction and venous dilatation were marked. The fields were concentrically contracted or (in forty percent) had characteristic nasal contraction.

Lawrence Dunlap.

Sallmann, L. **Trephining with cyclodialysis, a modification of Heine's cyclodialysis.** Zeit. f. Augenh., 1935, v. 86, May, p. 111.

Under a conjunctival flap the author makes a 1.5-mm. trephine opening through the sclera 8 mm. from the limbus. Through the opening a spatula is introduced with which cyclodialysis is done in one quadrant. After three years trial, the author is satisfied with his modification. Iritic irritation may be greater than after Heine's procedure but is usually less than after an Elliot operation. In one case central vision was lost. But complications are rare, and one is at least as certain of success as after the regular Heine cyclodialysis. (See also editorial, American Journal of Ophthalmology, 1935, volume 18, page 764.) F. Herbert Haessler.

Wolfsohn-Jaffé, Else. **Nine cases of hereditary glaucoma of adults in three generations.** Klin. M. f. Augenh., 1935, v. 94, May, p. 662.

The genealogic tree shows that the hereditary transmission of glaucoma was dominant. It was directly inherited in three generations. Onset was between the ages of thirty and forty years, with rainbow vision. Chronic inflammatory glaucoma predominated, and the course was generally very severe. No individual of the descendant generation was affected, although all had passed the twentieth year of age.

C. Zimmermann.

9. CRYSTALLINE LENS

Arkin, W. **Advantages and disadvantages of some new procedures in cataract extraction.** Klinika Oczna, 1935, v. 13, pt. 1, p. 91.

After detailed discussion of possible complications of new procedures in cataract extraction, such as akinesis, retrobulbar injection, conjunctival flap and sutures, and intracapsular extraction, the author concludes that their

merits outweigh their defects, which may be avoided by careful technique.

Ray K. Daily.

Chatterji, N. **After cataract.** Proc. All-India Ophth. Soc., 1933, v. 3, pp. 44-50.

The simplest form, a fine cobweb-like membrane in the pupillary area, usually a wrinkled posterior capsule, is best treated by needling after atropinization. The denser pupillary membrane consists of anterior and posterior capsule and more or less cortical material. If needling of this fails, the whole offending mass should be extracted through a keratome or Graefe-knife incision with curved iris forceps. (3) For the dense pupillary membrane after iritis or iridocyclitis, with occluded and drawn-up pupil, a six-months waiting period for the eye to quiet down may be followed by creation of an artificial pupil through the iris diaphragm.

Lawrence Dunlap.

Goldfeder, A. E. **Case of ring cataract of Szily: pathogenesis.** Klin. M. f. Augenh., 1935, v. 94, May, p. 623.

The ring cataract of Szily differs from the generally known congenital cataract by absence of the lenticular nucleus, which Szily attributed to congenital aplasia of the axial portion of the lens. Goldfeder observed this in a man of thirty-three years with persistent pupillary membrane, and ascribes the lack of lenticular nucleus to its absorption by bloodvessels of the pupillary membrane entering the center of the lens.

C. Zimmermann.

Jacoby, M. W., and Wolpaw, B. J. **Dislocation of Soemmering's ring. Report of a case.** Arch. of Ophth., 1935, v. 13, April, pp. 634-635.

Only six cases were found in the literature. A man aged sixty-six years had had a combined extraction in 1905. In 1918 a white ring appeared in the anterior chamber. Most of the ring was withdrawn through a keratome incision at the limbus. Eight weeks later a large corneal ulcer appeared. It healed slowly, leaving a dense corneal scar, with vision limited to light perception.

J. Hewitt Judd.

Jäger, A., and Vogelsang, K. **Measurements of elasticity and consistency in animal lenses.** Arch. f. Augenh., 1935, v. 109, April, p. 103.

The lens is brought in contact with a glass tube 9 mm. in diameter, filled with water, and connected with a suction bottle that creates a negative pressure of one-tenth atmosphere. The lens capsule, under suction, bulges into the tube, and the bulging can be directly measured. The posterior lens capsule is twice as elastic as the anterior, the contrast becoming greater with increase of age. The consistency of the lens changes after repeated stretching, for the nucleus detaches itself from the cortex. The consistency of the nucleus is measured by the weight under which it flattens 1 mm. This weight varies between 30 and 150 gm.

R. Grunfeld.

Lijo Pavia. **Senile cataract. Biomicrophotographs.** Arch. de Oft. Hisp.-Amer., 1935, v. 35, May, pp. 225-230.

The author has been able to photograph the slitlamp beam in patients with lenses undergoing cataractous changes. He believes this method, for which he suggests the denomination of biomicrophotography, to be useful for recording the changes experienced by the lens in the course of cataract formation. (10 photographs.)

R. Castroviejo.

Monjukova, H., and Fradkin, M. **Further experimental data on the pathogenesis of cataract.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 3, p. 293.

In former experiments on guinea pigs the authors found that two factors were necessary for development of experimental cataract—a general C avitaminosis, and a disturbance in ocular permeability. Since the fetus has no hemato-encephalic or hemato-ocular barrier, a general C avitaminosis alone should be sufficient to produce congenital cataract. To verify this hypothesis pregnant guinea pigs were placed on a vitamin-C-free diet and the lenses of their new-born were studied with the slitlamp. These lenses had zonular cataracts, consisting of two opaque

layers: a central, more densely opaque, in the posterior cortex, and a more peripheral layer above the first one, consisting of streaks and dots. These experiments repeated on chickens, which are not susceptible to C avitaminosis, were negative. Punctures of the anterior chamber of roosters on a vitamin-C-free diet did not lead to development of lenticular opacities, and the reformed aqueous humor was found to contain vitamin C although in lesser quantity than normal.

Ray K. Daily.

Müller, H. K. **Vitamin C and the problem of cataract.** Bull. Soc. Belge d'Opht., 1934, no. 69, p. 65. (See two abstracts, Amer. Jour. Ophth., 1935, v. 18, July, p. 674; also one abstract June, p. 591.)

Orlov, K. **Postoperative iridocyclitis after cataract extraction.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 3, p. 297.

After a review of the literature the author reports briefly experimental injections of cataract suspensions into the anterior chambers of guinea pigs. A suspension of the normal lens was tolerated without inflammatory phenomena, even by tuberculous animals, while a suspension of senile cataract, particularly of the nucleus, produced iridocyclitis. The author emphasizes the importance of removal of all lens masses in cataract extraction, by making the extraction intracapsular or by thorough irrigation of the anterior chamber. Ray K. Daily.

Seefelder, R. **Familial occurrence of cataract and poikilodermia.** Zeit. f. Augenh., 1935, v. 86, May, p. 81.

Three of the five children of normal and distantly related parents exhibited the skin affection associated with cataract which was first described by Rothmund in 1868. A third family has been examined by Siegrist and Schneider. The skin lesion is described as a poikilodermia vascularis atrophicans. The combination of cataract and skin affection is doubtless an ectodermal defect inherited recessively in an inbred population which has lived for a very long time in an isolated valley.

F. Herbert Haessler.

Shroff, C. N. **Intracapsular cataract operation suitable to the conditions in India.** Proc. All-India Ophth. Soc., 1933, v. 3, pp. 33-43.

After trying all methods the author is of opinion that a modified Smith intracapsular extraction using a hook at the lower edge of the lens, and tumbling all lenses, is superior to the Elschnig or Barraquer method and to any extracapsular method. This opinion was concurred in by Narayana Rao and Srinivasan and A. Fuchs, the latter reasoning that in the tropics the posterior capsule could cause visual disturbances. Lawrence Dunlap.

Vila Ortiz, J. M., Jr. **Traumatic rosette cataracts.** Arch. de Oft. Hisp.-Amer., 1935, v. 35, March, pp. 113-121.

Four cases are reported, three from a blow, and one from an intraocular foreign body. Three cases observed shortly after the accidents showed typical posterior subcapsular rosette formation in the lens. In the other the rosette was located in the anterior surface of the adult nucleus. The deeper location of the opacity in the last case is explained by the author, according to the theory of Vogt, by the juxtaposition of new lens fibers in the interval elapsed between the date of the accident and the date of the examination. (10 illustrations.) R. Castroviejo.

Weber, F. P. **Concerning ectopia lentis and its association with other anomalies of the body.** Münch. med. Woch., 1935, v. 82, Feb. 21, pp. 291-292.

Attention should be paid to the general habitus of these patients, as other anomalies like arachnodactylia are often associated with the eye condition.

Bertha Klien Moncreiff.

10. RETINA AND VITREOUS

Arruga, H. **Present status of treatment of detachment of the retina.** Arch. of Ophth., 1935, v. 13, April, pp. 523-537.

With improved technique the results of operations for detached retinas show a steadily increasing percentage of visual restorations, now exceeding fifty percent. The author discusses selection

of cases, preparation of the patient, instrumentarium, anesthesia, operation, precautions and complications. A successful outcome depends on prompt execution, accurate localization, and occlusion of tears by operative intervention. Though similar effects are obtained with thermocautery, galvanocautery, diathermy, or trephining, diathermy apparently possesses the greatest advantages. Steps in the author's technique are well illustrated by drawings. J. Hewitt Judd.

Baenziger, Theodor. **My first ten observations of acute spontaneous posterior detachment of the vitreous.** Graefe's Arch., 1935, v. 134, p. 23.

From January, 1887, to August, 1893, the author observed in ten eyes of eight patients the characteristic changes of vitreous detachment. All the patients had noted acutely occurring visual changes. These included appearance of flakes in three eyes, appearance of muscae in three eyes, and once each a "cloud", a "cobweb", and a "mist". In four cases, definite photopsia at first accompanied the other subjective symptoms. Ophthalmoscopically visible in all cases was a large movable and compact vitreous opacity, eight times floating before the papilla and once in front of the macula. Brief descriptions of the findings in these ten eyes, and also in five eyes of four patients observed since August, 1893, are given.

H. D. Lamb.

Barrada, M. A. **A case of subhyaloid exudation.** Bull. Ophth. Soc. of Egypt, 1934, v. 27, p. 59.

A case of subhyaloid exudation in the macula, due to arteriosclerosis, is reported. Rapid absorption of the exudate followed lavage of the maxillary sinuses, which were filled with pus. The case was interesting, also, in that there were opaque nerve fibers in an unusual situation, far removed from the optic disc, near the equator.

Edna M. Reynolds.

Bonnet, P. **Evolution of macular alterations in "angioid streaks of the retina," its analogy with senile macular exudative retinitis.** Arch. d'Opht., 1935, v. 52, April, p. 225.

Alterations of the macula appear, sooner or later, in the course of this disease, and are an integral part of the disease. In some cases reported macular changes preceded the formation of streaks, in others vice versa. Coppez and Danis, who observed that the clinical aspect of the macular lesions resembled that of senile macular exudative retinitis, grouped this disease with Coats' disease and circinate retinitis. The author supports this view, and reports the evolution of macular degeneration in a case of angioid streaks which he illustrates with a series of beautiful sketches. Derrick Vail.

Fodor, Géza. **A case of annular detachment of the vitreous behind the lens.** Klin. M. f. Augenh., 1935, v. 94, May, p. 651. (Ill.)

Immediately after a blow on the right eye a woman aged forty-two years noticed deterioration of vision. Eccentrically behind the lens in the pupillary area an oval ring of about 7 mm. diameter was seen, and in the macular region was a detachment of the retina, which gradually extended. The condition was undoubtedly rupture and detachment of the hyaloid membrane. The vitreous protruding through the hole detached the hyaloid membrane from the zonula and ciliary body, and between ora serrata and the equatorial region, where the hyaloid membrane is more firmly adherent to the retina, tore this membrane from the ora serrata. C. Zimmermann.

Klein, Miklos. **Needle and needle-holder for microcoagulation in retinal detachment.** Zeit. f. Augenh., 1935, v. 86, May, p. 127.

The needle consists of three parts: (1) a conical point 1 to 1.5 mm. long, whose end is blunt to prevent bleeding; (2) a ruby disc to insulate the point and to prevent excessive penetration; and (3) a thick shaft with an eyelet to be threaded with silk when introduced posteriorly. The forceps are made to fit the shaft exactly in two positions—with the axis of the shaft

lying in the axis of the forceps and at right angles to this line.

F. Herbert Haessler.

Koyanagi, Y. **The genesis of retinal detachment with intraocular tumors.** Graefe's Arch., 1935, v. 134, p. 62. (See Section 15, Tumors.)

Lijo Pavia, J. **Retinitis pigmentosa.** Rev. Oto-Neuro-Oft., 1935, v. 10, April, p. 84.

Three further observations of greyish-green discoloration of the choroidal intervascular spaces in retinitis pigmentosa are reported. Mixed organotherapy including pituitary extract produced varying results on the hemeralopia of the three cases and apparently in relation to the degree of discoloration observed. The melanophoric action of some endocrine glands is suggested as a possible explanation.

M. Davidson.

MacDonald A. E., and McKenzie, K. G. **Sympathectomy for retinitis pigmentosa.** Arch. of Ophth., 1935, v. 13, March, pp. 362-373; also Trans. Amer. Ophth. Soc., 1934, v. 32, p. 172.

Four male patients, aged 45, 24, 25, and 25 years, were treated by cervical sympathectomy, which in three cases included removal of the stellate ganglion. All were of long standing. Two showed slight improvement, one showed regression, and one remained unchanged. Horner's syndrome resulted in those cases in which the stellate ganglion was extirpated. To avoid establishment of a "local vasomotor control" by the superior cervical ganglion, it is suggested that resection of the superior and middle cervical ganglions, together with sympathectomy of the pericarotid nerves, is preferable to section of the trunk below the stellate ganglion or removal of the stellate ganglion itself. (Perimetric charts and fundus photographs.)

J. Hewitt Judd.

Marchesani, O. **Thromboangiitis obliterans in the eye.** Arch. f. Augenh., 1935, v. 109, April, p. 124.

The author disputes the commonly accepted idea that retinal periphlebitis is of tuberculous origin, for no positive proof has yet sustained this etiology. The author regards thromboangiitis obliterans as the cause of the periphlebitis. In three cases under his observation retinal periphlebitis was associated with thromboangiitis obliterans in other organs of the body. In one case dry gangrene of the extremities led to amputation of the legs. The second patient had necrosis of the left toe and an infarct of the lung. The third case, in which successively both eyes became involved, had dry necrosis of the right little finger. This patient's right eye was enucleated for complicating hemorrhagic glaucoma, and pathologic study showed that the small peripheral vessels were chiefly affected, their lumens being obstructed either by subendothelial edematous tissue, by noncellular fibrin-like masses, or by granulation tissue with new-formed vessels, vacuoles, and fine canalization.

R. Grunfeld.

Poyales, F. **The present status of the pathogenesis and treatment of retinal detachment.** Rev. Cubana de Oto-Neuro-Oft., 1935, v. 4, Jan.-Feb., p. 5.

Examination of fresh enucleated eyes with detachment not complicated by inflammatory processes indicates that the principal mechanism in idiopathic detachments is traction of the vitreous forward by anterior adhesions.

M. Davidson.

Rubbrecht, R. **Suture of the retina.** Bull. Soc. Belge d'Opht., 1934, no. 69, p. 14.

In a patient with retinal detachment of two weeks duration the eye ground was found to be normal after twenty-four hours rest in bed. No trace of a tear or other retinal lesion could be found. The patient walked about for fifteen minutes, and the detachment reappeared but promptly yielded again to rest in bed. Fixation of the retina was effected by two sutures, the needle entering the globe at 11 mm. and coming out at 18 mm. from the corneal limbus, and the two sutures being 6 mm. from each other. The sutures were removed on the fourth day. There was scarcely

any pain. There was considerable preretinal effusion. In spite of a violent attack of sneezing about three weeks after the operation the retina remained in place and eventually the visual acuity was completely restored. The author notes similar excellent results in other cases reported in a previous communication. He believes the method to be especially applicable in recent cases and those in which the origin of the detachment can be precisely located. One might add patients in whom coughing or vomiting is to be feared.

J. B. Thomas.

Sallmann, L. **Retinal folds in processes which decrease the volume of the orbital cavity.** Zeit. f. Augenh., 1935, v. 86, April, p. 18. (See Section 13, Eyeball and orbit.)

Salvati, G. **Clinical observation regarding the etiology of preretinal hemorrhages.** Bull. Ophth. Soc. of Egypt, 1934, v. 27, p. 68.

The author draws attention to the fact that increase in blood pressure is in many cases the underlying cause of preretinal hemorrhage. He reports four such cases in which complete absorption of the hemorrhage followed drastic hypotensive treatment with purgatives, reduction of fluid intake, sweats, and so on.

Edna M. Reynolds.

Samuels, Bernard. **Pathologic changes in the anterior half of the globe in obstruction in the central vein of the retina.** Arch. of Ophth., 1935, v. 13, March, pp. 404-418; also Trans. Amer. Ophth. Soc., 1934, v. 32, p. 369.

The histologic changes in the anterior segments of twenty-nine globes indicate that toxins derived from disintegration of red blood-cells and from degeneration of the retinal tissues and of the vitreous produce proliferation of endothelial cells and formation of capillaries from the root of the iris. This results in membrane formation and in blocking of the angle of the anterior chamber. The usual escape of toxins through the blood and lymph is prevented by obstruction of the main vein with congestion and edema of the nerve head. (Photomicrographs.)

J. Hewitt Judd.

Savin, L. H. **A case of "Budd's" (or Chiari's) disease in which thrombosis of the hepatic veins . . . . . was preceded by . . . . . iridocyclitis and secondary glaucoma.** Trans. Ophth. Soc. United Kingdom, 1934, v. 54, p. 326.

In December, 1930, a patient with an obscure abdominal condition was found to have bilateral iridocyclitis. The Wassermann and Pirquet tests and dental and nose and throat examinations were negative. As the vitreous opacity cleared, a massive exudate was seen to the nasal side of the left disc, with macular disturbance of pigment and cupping of the disc. A successful trephine operation was performed, but the vision gradually deteriorated and later the patient was certified as blind.

In November, 1933, he developed severe abdominal symptoms. He died six weeks after admission. Post-mortem examination, which did not include an eye examination, revealed complete thrombosis of the inferior vena cava up to the right auricle. The main hepatic veins were filled with a similar adherent clot. Microscopic sections of the liver showed an acute complete necrosis of the hepatic lobules with the exception of narrow zones round the portal canals.

Beulah Cushman.

Scheerer, R. **Improved perimeter for localization in detachment of the retina.** Klin. M. f. Augenh., 1935, v. 94, May, p. 681.

The apparatus is illustrated and described.

Sobhy Bey, M. **The duties of ophthalmic surgeons in cases of fresh detachments in the light of modern surgery.** Bull. Ophth. Soc. of Egypt, 1934, v. 27, p. 39.

Emphasized details are exact localization, the value of stenopaic glasses, and suitable position in bed rest. Cases which do not improve under bed rest and cases of macular detachment in which reapplication is not quickly secured are recomended for immediate operation.

Edna M. Reynolds.

Swab, C. M. **Tuberculous and streptococcic retinal hemorrhages.** Arch. of Ophth., 1935, v. 13, April, pp. 620-629; also Trans. Amer. Ophth. Soc., 1934, v. 32, p. 388.

Five cases demonstrating retinal hemorrhages are reported. Three cases were classified as tuberculous and were improved by tuberculin therapy. Two cases cleared after removal of streptococcic focal infections. The retinal hemorrhages, although different etiologically, were similar in onset and in the character of the active lesions. A common sequel in the cases of tuberculous origin was retinitis proliferans. (Fundus photographs.)

J. Hewitt Judd.

Terrien, F., Veil, P., and Dollfus, M. **The evolution of the treatment of retinal detachment.** Arch. d'Opht., 1935, v. 52, March, p. 153.

This historical discussion points out that in 1894 Gillet of Grandmont reported a cure following electrolysis.

Derrick Vail.

Veil, P. and Dollfus, M. **Obliteration of retinal tears by diathermocoagulation.** Arch. d'Opht., 1935, v. 52, March, p. 162.

The authors discuss their technique, utilizing bipolar perforating diathermocoagulation with an active electrode in one series of cases, and in another the pyrometric technique of Coppez slightly modified. They operate in a dark room, using the ophthalmoscope first to see if they are hitting the area, and second to judge if the amount of current is correct. They do not consider that the contact glass is necessary, because the local anesthetic used does not disturb the corneal transparency, which is easily maintained by flushing with sterile saline solution. They obtained 55 percent cures with perforating electrocoagulation and 58 percent with nonperforating diathermocoagulation associated with perforating microcoagulation. Cicatrization is much slower after electrocoagulation than after thermocauterization or galvanocauterization. The patient must remain in bed longer, and must wear stenopeic glasses longer. (Bibliography.) Derrick Vail.

Velhagen, Karl, Sr. **A rare granuloma of the retina.** Klin. M. f. Augenh., 1935, v. 94, April, p. 457. (Ill.)

A man of thirty-nine years showed detachment of the retina without visible tear, very steep in its lower anterior temporal portion, and reaching to the macular region. Histologic examination after enucleation revealed a granulation tumor with plasma and giant cells, but no tubercle bacilli. Although there was no scar from a former injury it was assumed that probably a foreign body had caused irritation which led to development of the granuloma. But it might have been a solitary tubercle. C. Zimmermann.

Victoria, M., and Lijo Pavia, J. **Epilepsy and cystic degeneration of the retina.** Rev. Oto-Neuro-Oft., 1935, v. 10, May, p. 113.

Bilateral cystic macular degeneration was accompanied by attacks of epilepsy in a child of eight years. The epilepsy was attributed to a birth injury, and neither a diagnosis of Tay-Sachs disease nor of juvenile amaurotic idiocy nor of hereditary lues fitted the picture.

M. Davidson.

Villani, G. **Reaction of ciliary body and iris to surface diathermocoagulation.** Boll. d'Ocul., 1934, v. 13, Oct., pp. 1336-1361.

In ten rabbits the writer applied a 2 mm. electrode at the limbus after freeing the conjunctiva, using Weve's method with a 150 ma. current for five seconds. In some cases necrosis of the underlying tissue resulted. The eyes were enucleated from twenty-four hours to three months later, and indicated that diathermocoagulation caused a series of lesions ranging from simple infiltration and hemorrhage to destructive changes in the ciliary zone. The secondary atrophic process was purely local and did not damage the vitality and function of the eye. (Bibliography, six photomicrographs.)

M. Lombardo.

Vogt, Alfred. **Posterior and anterior detachment of the vitreous and the prepapillary vitreous ring.** Graefe's Arch., 1935, v. 134, p. 1.

Posterior detachment of the vitreous is a not unusual myopic, senile myopic, or senile change. It occurs suddenly and as a rule is accompanied by photopsias. Frequently there is a posterior, prepapillary vitreous ring (or band), which produces entoptic images. This ring represents the margin of an opening in the posterior limiting layer of the vitreous. The part of the vitreous dorsal to and above the detached limiting layer is disclosed by the slitlamp as relatively clear, while the detached part (below and forward) is relatively opaque. The latter contains the larger part of the vitreous network. Posterior detachment of the vitreous, in general, cannot be considered as the cause of spontaneous detachment of the retina. Where both occur together, they are associated presenile or senile degenerative changes. They occur not only in axial myopia but principally as signs of senile and presenile destruction.

H. D. Lamb.

Wagener, H. P., Dry, T. J. S., and Wilder, R. M. **Retinitis in diabetes.** New England Jour. of Med., 1934, v. 211, Dec., p. 1131.

The authors examined the eye grounds of 1,052 diabetics, of whom 5.5 percent showed only hemorrhages and 12.2 percent showed hemorrhages associated with exudates. The retinal lesions occur mostly in patients over forty years of age, and are usually associated with hypertension or other evidence of general vascular disease. In this series, however, 12 percent were entirely free from vascular disease. The authors believe that diabetes injures the finer arterioles or venules, probably the latter. When the patient is afflicted with other disease of the vascular system, particularly hypertension, the lesion characteristic of diabetes is superimposed.

M. E. Marcove.

Wagner, Hans. **Macular changes associated with lanugo type of hair in two brothers.** Graefe's Arch., 1935, v. 134, p. 74.

In two brothers, ten and four years old, the hair on the head was of lanugo type and practically free from pigment. In the first case the macular region in each eye was occupied by a rather sharply circumscribed dark focus about 1/5 disc diameter in diameter, around which were scattered many very small specks of pigment. In the macular region of both eyes of the second boy were observed several sharply circumscribed dark flecks of pigment. Between and around the latter, over an area of one disc diameter, were scattered numerous very small lighter specks of pigment.

H. D. Lamb.

Weskamp, C. **Differences in the level of the central retinal vessels.** Klin. M. f. Augenh., 1935, v. 94, April, p. 506. (Ill.)

The measurements were made with Thorner's large ophthalmoscope. Out of thirty individuals at various ages and both sexes the artery lay more superficially than the vein in fifteen, deeper in thirteen and at the same level in two (both lying superficial to the optic disc). Out of thirty-one patients with hypertension and cardiorenal insufficiency the artery lay more superficially in twenty-four, deeper in seven, but never at the same level as the vein; and the difference of level was greater (somtimes considerably so) than in normal subjects.

C. Zimmermann.

Weve, H. **The relations between the larger, isolated retinal cysts and retinal detachment.** Arch. f. Augenh., 1935, v. 109, April, p. 49.

Large single cysts and detachment of the retina are often found together. The cysts are usually situated in the region of retinal tears. The author believes that both have a common origin in congenital malformation or as late manifestations of trauma. He distinguishes true and false cysts. The latter develop from adhesions between folds of a detached retina. The true cyst usually grows slowly from a cavity in the outer nuclear layer, and is present a long time before it causes detachment either from bursting of the cyst or from stretching of the adjacent retina. The cysts are rarely recognized, because of their extremely peripheral location and the haziness of the retina.

Treatment must attempt extirpation of the cysts. R. Grunfeld.

Wilczek, M. **Splitting of the retina.** Klinika Oczna, 1935, v. 13, pt. 1, p. 1.

After a review of the various types of hole in retinal detachment, the author reports a second case of detachment with splitting of the retina into two layers, in an apparently healthy eye of a woman of thirty-five years. The inner retinal layer was seen as a reddish tense vascular membrane with numerous small holes, while the outer layer had large holes with grey edges. The author considers this as a distinct type of detachment to be added to those described by Guist and Vogt. (Illustrations.) Ray K. Daily.

11. OPTIC NERVE AND TOXIC AMBLYOPIAS

Boros, Bela. **The etiology of optic neuritis of unknown origin.** Zeit. f. Augenh., 1935, v. 86, June, p. 214.

Twenty-nine percent of cases of optic neuritis observed at the Pecs clinic were of unknown origin. Five could be reexamined later, and four of these had developed signs of multiple sclerosis.
F. Herbert Haessler.

Cordes, F. D., and Harrington, D.O. **Toxic amblyopia due to tobacco and alcohol. Treatment with vasodilators.** Arch. of Ophth., 1935, v. 13, March, pp. 435-444.

The authors review the literature and report eight cases in men from twenty-nine to eighty years of age, in whom rapid and decided visual improvement followed the use of sodium nitrate solution subcutaneously and erythrol tetranitrate by mouth.
J. Hewitt Judd.

Démètriades, J. **Three cases of optic neuritis following the use of acetylarsan.** Bull. Ophth. Soc. of Egypt, 1934, v. 27, p. 74.

The author reports three cases in which bilateral optic neuritis followed the use of pentavalent arsenic preparations in the treatment of syphilis. In one case, the patient recovered normal vision after the cessation of treatment, but in the other two the vision was permanently impaired. Examination by an oculist before the use of arsenicals, and also urinalyses to avoid intoxication due to retention, are recommended by the author. Edna M. Reynolds.

Heine, L. **Optic neuritis and papilledema, with special reference to early and mistaken diagnosis.** Deut. med. Woch., 1935, April 19, p. 624.

Heine believes that the most important point in the differentiation is whether or not the fundus picture changes progressively. He reports seventeen cases of papilledema in which no decompression operation was done but which recovered completely. Three cases were diagnosed as congenital pseudopapilledema and fourteen showed definite pathologic processes. Six cases were diagnosed as multiple sclerosis; one appeared to be cured after twenty-two years, although the lower extremities were paralyzed. In a child, the papilledema was due to an affection of the cerebellopontine angle (acoustic tumor?). In two cases the papilledema was probably due to lues although there were no positive findings. In one case the patient died ten years later from miliary tuberculosis. Another was also due to tuberculosis. In two cases, meningitis was the most probable cause. One case went undiagnosed.
Theodore M. Shapira.

Keyes, J. E. L. **Observations on four thousand optic foramina in human skulls of known origin.** Arch. of Ophth., 1935, v. 13, April, p. 538; also Sec. on Ophth., Amer. Med. Assoc., 1934, 85th session, pp. 248-279.

Variations in bony structures about the optic foramen were studied in the skulls of 2,187 specimens. Clinocarotid canals were present in 34.84 percent, and osseous bridges were attached to the posterior clinoid processes in 8.68 percent. In the floor of the optic foramen a lesser foramen was noted in 0.22 percent and a sulcus in 1.64 percent. From roentgenograms it was found that these aberrations did not involve the lumen of the foramen and that the ophthalmic foramina or sulci could be

clearly seen. The relation between projected long axes of the optic foramen and the plane of the orbital rim was studied, and a method was developed for obtaining exact roentgenograms of optic foramina in the dry skull. It is not possible as a routine to calculate the size and shape of an optic foramen from a roentgenogram. Variations in the caliber of the optic foramen were frequent. (Photographs, discussion.)

J. Hewitt Judd.

Kunz, E., and Isenschmid, R. **Toxic action of trichlorethylen on the visual organ.** Klin. M. f. Augenh., 1935, v. 94, May, p. 577.

Trichlorethylen, CCl_2-CHCl, is a so-called organic dissolving product and is extensively used for cleaning purposes. A laborer who was exposed to evaporation of from 100 to 130 c.c. of trichlorethylen per day acquired retrobulbar neuritis, polyneuritis, and reflex pupillary immobility. The effect is related to alcohol amblyopia, but has a more severe course.

C. Zimmermann.

Lijo Pavia, J., and Victoria, M. **Papilledema and chickenpox.** Rev. Oto-Neuro-Oft., 1935, v. 10, Jan., p. 1.

Two cases of papilledema complicating chickenpox, erroneously (the authors believe) described as optic neuritis, have so far been reported in the literature. The authors' case occurred in a boy of nine years, two weeks after a severe attack of chickenpox with signs of meningeal irritation. Vision improved and the edema subsided in two weeks under lumbar punctures and intravenous glucose injections. Serous meningitis is considered the cause and the prognosis is good. (Illustrated.)

M. Davidson.

Löwenstein, Arnold. **Sympathectomy (Leriche-Doppler) at the carotid in the treatment of atrophic processes in the retina and optic nerve.** Graefe's Arch., 1935, v. 133, p. 636. (See Section 10, Retina and vitreous.)

Pilman, H. **The effect of carbon-monoxide poisoning on the eye.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 3, p. 360.

Examination of seventy patients with chronic carbon-monoxide poisoning showed that visual involvement began with contraction of the field for green, followed gradually by contraction for red, blue, and white, and finally by loss of central color vision. In severe cases dark adaptation was impaired and visual acuity reduced to from 0.1 to 0.2, with a normal fundus picture. In two cases reported, under observation for two years, loss of color vision was permanent in spite of occupational change and recovery from the other toxic symptoms. After a review of the literature the author concludes that the ocular symptoms of gas poisoning confirm the theory of the physiologic unity of light and color perception. The permanent loss of color perception with recovery of form sense and visual acuity points to differentiation of some nerve cells for color perception.

Ray K. Daily.

Sobanski, J., **Pseudoneuritis; pseupapillitis.** Klinika Oczna, 1935, v. 13, pt. 1, p. 64.

The author reports a case of pseudoneuritis in a boy of 13 years. The intraocular tension was 8 to 10 mm. of Hg, and could not be raised by tension-raising drugs. Intracranial and general blood pressure were normal. The minimum venous tension was high but was within the normal, while the diastolic retinal arterial tension was lowered to the extent of bringing the ratio of minimum retinal to arterial pressure to 1:1.6. Such a relation between venous and arterial retinal tensions is found in cases of choked disc, and the author believes that the pathogenesis of pseudoneuritis and choked disc is the same, and consists in a disturbed relation between venous and arterial retinal circulation. In choked disc the pathologic ratio is caused by a rise in venous pressure, while in this case it was due to the low arterial pressure, which the author attributes to the low intraocular tension.

Ray K. Daily.

12. VISUAL TRACTS AND CENTERS

Jaensch, P. A. **Disturbances of fusion after concussion of the brain.** Klin. M. f. Augenh., 1935, v. 94, April, p. 470.

In five cases after concussion of the brain Jaensch observed limitation or entire absence of fusion, which explained the distressing rapid fatigue of the eyes and occasional diplopia. Improvement is possible only in exceptional cases. As attempts with prisms showed, any treatment is hopeless. The cases gave no clue to the seat of the fusion center, but the author assumes with Bielschowsky, Best, Ohm, and others that the path leads from the retina to the visual cortex and thence as motor portion of the visual radiation to the posterior longitudinal fascicle and the nuclei of the ocular nerves. The range of fusion was tested with the universal prism apparatus of Bielschowsky or the double prism of Herschel-Landolt. It ought to be tested in all cases of concussion of the brain.

C. Zimmermann.

Lijo Pavia, J. **Effects of deep x-ray therapy on visual fields after extirpation of a sellar tumor.** Rev. Oto-Neuro-Oft., 1935, v. 10, Feb., p. 25.

Deep therapy applied because of diminution of vision, after extirpation of a supposedly benign sellar tumor three years previously, at first improved vision and fields and later seemed to reduce them. The erratic effect is believed due to unequal distribution of the radiation within the neoplastic mass.

M. Davidson.

Magoun, H. W., Ranson, S. W., and Mayer, L. L. **The pupillary light reflex after lesions of the posterior commissure in the cat.** Amer. Jour. Ophth., 1935, v. 18, July, pp. 624-630.

Velhagen, K., Jr. **Cases with calcification shadows near the chiasm.** Klin. M. f. Augenh., 1935, v. 94, May, p. 586.

In seven cases roentgen rays showed calcification shadows near the chiasm, with ophthalmoscopic pictures of glaucoma simplex or optic nerve atrophy. In one there was a sellar bridge in association with a calcification shadow, in another a unilateral sellar bridge.

C. Zimmermann.

Wibo. **Hypophyseal tumors and endocrine glands.** Bull. Soc. Belge d'Opht., 1934, no. 69, p. 133.

Tumors of the hypophysis are often overlooked, in the early stages by oculists, and in all stages by internists and gynecologists. The endocrines are blamed for many uncertain symptoms. A young married woman twenty-eight years old presented the adiposogenital syndrome of Frölich and gave a history of prolonged galactorrhea after birth of her second child, followed by amenorrhea for two years. Progressive loss of visual acuity and headaches increasing in severity were complained of. After three years of uncertain diagnoses and unsuccessful general treatment for "endocrine troubles" and so on, the presence of optic atrophy and narrowing of the temporal fields of vision pointed to the hypophysis and roentgenographs confirmed the diagnosis. Operation by the transfrontal route revealed a large cyst of the hypophysis, removal of which relieved general and ocular symptoms.

J. B. Thomas.

13. EYEBALL AND ORBIT

Arkin, W. **The hereditary factor in microphthalmos.** Klinika Oczna, 1935, v. 13, pt. 1, p. 119.

After a review of the literature, three cases are reported, two associated with strabismus, coloboma of the iris, and persistent hyaloid artery, and one with congenital cataracts, nystagmus, and anomalies of the skull and heart.

Ray K. Daily.

Ballantyne, A. J. **Multiple structural anomalies in the eye.** Trans. Ophth. Soc. United Kingdom, 1934, v. 54, p. 363.

A male aged twenty-nine years whose right vision had always been poor had a lymphangiectasis of the nasal bulbar conjunctiva, an orbital hemangioma, and anomalous position of the central retinal vessels, which were twice the size of the vessels in the other eye.

Beulah Cushman.

Baratta, O. **Inflammatory pseudotumors of the orbit.** Rassegna Ital. d'Ottal., 1935, v. 4, March-April, p. 196.

A woman of 58 years suffered diminution of vision in the left eye two

weeks after an attack of influenza. There were signs of orbital cellulitis with slight exophthalmos and infection of the frontal and ethmoid cells. Physical examination, laboratory tests, and neurologic studies gave otherwise negative results. Death occurred seven weeks later. In addition to the inflammatory pseudotumor of the orbit, classified as Birch-Hirschfeld's type three, autopsy revealed an epithelioma of the kidney with metastasis to the frontal lobe. The case illustrates the necessity for very careful check-up to discover all the morbid processes present. (4 illustrations.)

Eugene M. Blake.

Bielschowsky, A. **The influence of exophthalmos on the function of paretic ocular muscles.** Amer. Jour. Ophth., 1935, v. 18, June, pp. 503-507.

Borsellino, G. **Bilateral, familial microphthalmos associated with congenital macular degeneration.** Rassegna Ital. d'Ottal., 1935, v. 4, March-April, p. 181.

The author describes three cases of bilateral microphthalmos in two of which there were lesions of the macula and optic nerve. It is probable that the third case, whose fundus could not be explored, had a similar condition. All three patients were brothers, two were twins. The fundus changes consisted of optic atrophy and a macular degeneration about two disc diameters in size, with pigmented borders. These changes were thought to be of the familial degenerative type, in spite of absence of any other cases in the family. (3 illustrations.) Eugene M. Blake.

Cattell, R. B. **Eye complications in exophthalmic goiter.** Annals of Surg., 1934, v. 100, Aug., p. 284. (See Section 17, Systemic diseases and parasites.)

Davies, W. S. **Megalophthalmos.** Amer. Jour. Ophth., 1935, v. 18, June, pp. 542-544.

Dusseldorp, M. **Two cases of accidental penetration of caustic liquids into the orbit from the nose.** Arch. de Oft. de Buenos Aires, 1935, v. 10, Feb.-March, p. 74. (See Amer. Jour. Ophth., 1935, v. 18, June, p. 600.)

Herschendörfer, A. **Restoration of the conjunctival sac by means of a free epithelial transplant.** Klinika Oczna, 1935, v. 13, pt. 1, p. 28. (See Amer. Jour. Ophth., 1935, v. 18, April, p. 403.)

Ray K. Daily.

Joiris, P. **Craniofacial hereditary dysostosis or Crouzon's disease.** Bull. Soc. Belge d'Opht., 1934, no. 69, p. 40.

The author reports a case and gives a brief sumary of our incomplete knowledge of this affection. (Two illustrations, fourteen references.)

Marchesini, E. **A rare form of intermittent exophthalmos with descending atrophy of the optic nerve.** Ann. di Ottal., 1935, v. 63, April, p. 263.

A man of forty-five years had a left intermittent exophthalmos which became enophthalmos according to the position of the subject, on compression of the jugular, or on forced expiration with closed glottis. There was intermittent tumefaction of the lateral third of the left lower lid. In the left temporal region and inside the left cheek was an angiomatous mass which was augmented in volume by change in position of the head. The vision of the left eye had been entirely lost and ophthalmoscopic examination showed simple optic atrophy. The literature is extensively reviewed and similar cases analyzed. The author ascribes the condition to a congenital malformation. (Bibliography, two plates.)

Park Lewis.

Medvedev, H. **Restoration of the conjunctival sac.** Sovietskii Viestnik Ophth., 1935, v. 6, pt. 2, p. 203.

The author used with success autoplastic and homoplastic scleral grafts. The scleral tissue takes well, becomes covered with epithelium from the edges, and shrinks but very slightly. (Illustrations.) Ray K. Daily.

Meyer, M. F., and Roeling, J. C., **Orbital abscess (following foreign body of orbit) and meningitis with recovery.**

Arch. of Ophth., 1935, v. 13, March, pp. 445-446.

In a boy aged ten years, an orbital abscess resulted from splinters of wood in the orbit and produced meningitis. The spinal fluid contained B. pyocyaneus. The orbit drained for about two months, but the patient recovered without the aid of serums after removal of the focus, combined with repeated lumbar puncture. J. Hewitt Judd.

Koszutski, B. **Clinical observations.** Klinika Oczna, 1935, v. 13, pt. 1, p. 116. (See Section 5, Conjunctiva.)

Sallmann, L. **Retinal folds in processes which decrease the volume of the orbital cavity.** Zeit. f. Augenh., 1935, v. 86, April, p. 18.

Certain characteristic folds of the retina have been observed in orbital formations which compressed or displaced the globe. To six described in the literature Sallmann adds three. In two the lesion was a mucocele of the frontal sinus, and in one of them an inflammatory pseudotumor. In all the eyes the retinal folds were horizontal in the region between the temporal side of the disc and the periphery. In one there were also radial folds in the upper nasal quadrant. Whether all the retinal layers were involved could not be determined with the slitlamp. The folds all occurred within the first eight weeks of the disease. The observations in the literature indicate that improvement is slow and incomplete. Almost all the eyes have hypotomy.

F. Herbert Haessler.

Schneider, C. O. **The use of protheses over unsightly eyes.** Amer. Jour. Ophth., 1935, v. 18, June, pp. 555-556.

Towbin, B. G., Gorodissky, H., and Drobowa, G. W. **The influence of carotin upon chemical processes in the eye.** Graefe's Arch., 1935, v. 133, p. 578.

The right eyes only of ten rabbits were subjected to cauterization at the corneal center or to iridectomy. In each of five of the traumatized or operated eyes, 2 to 3 drops of carotin solution were instilled into the conjunctival sac at the time of operation and in the course of the next four days. On the fifth day after operation the rabbits were killed and the eyes enucleated. The aqueous and vitreous humors from both operated and unoperated eyes were chemically examined as to total nitrogen and sugar, and the intensity of glycolysis. It was found that operation increased the amount of total nitrogen in both the aqueous and vitreous humors, increased the amount of sugar in the aqueous, and increased the intensity of glycolysis in the aqueous and vitreous humors. Instillation of the carotin solution further increased the content of nitrogen and the degree of glycolysis in both aqueous and vitreous humors but lowered the postoperative increase of sugar in the aqueous.

H. D. Lamb.

14. EYELIDS AND LACRIMAL APPARATUS

Abu-Saif, Nessim. **The x-ray treatment of blepharitis.** Bull. Ophth. Soc. of Egypt, 1934, v. 27, p. 86.

The pathology of blepharitis is reviewed and the method of treatment with x-rays as carried out by the author is described in detail. An epilation dose of x-ray is given fractionally to the everted lids. Twenty cases were treated by the author and all were cured. Two cases where the treatment failed to cause complete epilation showed recurrence but these were cured by repetition of the treatment.

Edna M. Reynolds.

Baldino, S. **Correction of trachomatous entropion of the upper lid.** Rassegna Ital. d'Ottal., 1935, v. 4, March-April, p. 212.

A horizontal skin incision is made 3 mm. above the ciliary border for the whole length of the lid. The tarsus is bared and incised for its whole length about 1 mm. above the hair bulbs. One needle of a doubly armed suture is passed through the upper portion of the tarsus, 3 mm. above the cut edge, and emerges at the cut edge. The second needle is introduced into the lower tarsal rim in the same way. The suture is tied on the conjunctival surface. A suture is passed through the skin of the

lid below the incision and is carried up under the skin above the incision to the tarsal ligament and down in the same manner. When tied, this suture draws the skin incision together and produces a V-shaped separation of the tarsal parts, resulting in eversion of the lid margin. Three such sutures are employed. Good results have been obtained by this procedure. (1 ill.)
Eugene M. Blake.

Barber, H. W. **The etiology and treatment of some conditions affecting the eyelids.** Trans. Ophth. Soc. United Kingdom, 1934, v. 54, p. 426.

As a dermatologist, the author discusses and outlines the treatment of diseases of the eyelids, including eczema, seborrhea, blepharitis, rosacea, recurrent streptococcal lymphangitis, disturbances arising from the endocrine and autonomic nervous systems, herpes simplex, miliary lupoid, and rosaceous tuberculide. He emphasizes the value of a high vitamin diet in association with local medication and restriction of carbohydrates. Beulah Cushman.

Cohen, Henry. **An early ocular sign in facial paresis.** Brit. Jour. Ophth., 1935, v. 19, May, p. 267.

If there is any weakness of the orbicularis palpebrarum, it can no longer antagonize the contraction of the levator palpebrae superioris and the eye tends to open. This degree of weakness occurs in the early stages of facial paresis, and late in the recovery stage.
D. F. Harbridge.

Fahmy, A. Y. **The pathology of dacryocystitis.** Bull. Ophth. Soc. of Egypt, 1934, v. 27, p. 41.

The histopathology and bacteriology of dacryocysititis and peridacryocystitis are given in considerable detail. (Twenty-four photomicrographs.)
Edna M. Reynolds.

Fazakas, Alexander. **Corneal and meibomian mycosis from acrostalagmus.** Klin. M. f. Augenh., 1935, v. 94, April, p. 514. (Ill.) (See Section 6, Cornea and sclera.)

Goldfeder, A. **A new blepharoplastic method for cicatricial ectropion, using a free graft of the skin of the auricle.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 2, p. 173.

The skin of the auricle is closely related morphologically and biologically to the skin of the lids, and is exposed to the same environmental conditions. It takes better and has a better cosmetic effect than grafts from other parts of the body. Ray K. Daily.

Hollander, L., and Baer, H. L. **The common disorders of the skin of the eyelids.** Amer. Jour. Ophth., 1935, v. 18, July, pp. 616-623.

Iakovleva, A. **An attempt at general immunization in dacryocystitis.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 3, p. 392.

This gives the results obtained with subcutaneous injection of autogenous vaccines in twenty-one cases of dacryocystitis, twelve of which had phlegmon or fistula. The treatment was least effective in five cases of pneumococcus infection, in which the phlegmon subsided but secretion and epiphora persisted. In diseases caused by other microorganisms the results were most satisfactory. Ray K. Daily.

Kagan, I. **Treatment of trachomatous ptosis.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 3, p. 416.

Having obtained in ten cases excellent results which held over a five-year period of observation, the author warmly recommends thinning of the thickened cartilage by shaving it off in slices as in the operation of Anagnostaki. Ray K. Daily.

Koszutski, B. **Operation for blepharochalasis.** Klinika Oczna, 1935, v. 13, pt. 1, p. 112.

This case was corrected by excision of a strip of skin from the lid and by partial excision of the lacrimal gland. (Photographs.) Ray K. Daily.

Moreu, A. **Dacryocystorhinostomy and its clinical results.** Arch. de Oft. Hisp.-Amer., 1935, v. 35, March, pp. 127-139.

The author discusses briefly his experience with the dacryocystorhinosto-

my operation. The method used is a slight modification of Basterra's method (skin incision, trephining with a drill, suturing a flap of nasal mucosa to the anterior lip of a similar flap made in the sac). Indications, complications, and causes of failure of the operation are enumerated. R. Castroviejo.

Mourzinn, N., and Souchkowa, G. **Lysozyme of tears in trachoma.** Rev. Internat. du Trachome, 1935, v. 12, Jan., pp. 1-15. (See Section 5, Conjunctiva.)

Panneton, P. **Cyst of the inferior palpebral cul-de-sac.** Ann. d'Ocul. 1935, v. 172, May, pp. 379-383.

A man of twenty years developed a swelling of the lower lid after a severe blow from a hockey puck. Three months later a very large cyst was found occupying most of the inner surface of the lower lid. A limpid fluid was obtained on aspiration. The cyst quickly refilled. Several months later the mass was excised intact. The microscopic appearance was typical of an inclusion cyst. There is a general discussion of conjunctival cysts.

John C. Long.

Pochisov, H. **Operation for blepharospasm.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 1, p. 131.

The author reviews the surgical procedures developed for the relief of blepharospasm, and described his operation, which consists of canthotomy and subcutaneous division of the attachment of the outer portion of the lower lid to the orbit. It weakens the action of the subtarsal portion of the orbicularis, which is the chief offender in this disturbance. Ray K. Daily.

Rauh, Walter. **Extensive destruction of the eyelids and skin of the face after lupus and lues, and its surgical treatment.** Zeit f. Augenh., 1935, v. 86, June, p. 193.

The author briefly describes his results in two cases of extreme destruction of the skin of the face, in each of which the patient was so benefited by plastic surgery that he could return to his normal environment. Pictures illustrate four stages of recovery in each patient. F. Herbert Haessler.

Schläpfer, Hans. **The entropion operation of Alfred Vogt.** Klin. M. f. Augenh., 1935, v. 94, May, p. 610. (Ill.)

After temporal canthotomy to the bone a suture is carried through the skin of the upper lid near the ventral edge of the cut, emerging from the wound surface, and then to the conjunctiva near the dorsal edge of and through the wound of the lower lid. The ventral wound edge of the upper lid is thus pressed on the dorsal wound edge of the lower lid and the suture is tied. The upper end of the tarsus of the lower lid is thus crowded away from the globe. C. Zimmermann.

Schornstein, Th. **Congenital fistula of the lacrimal gland.** Arch. f. Augenh., 1935, v. 109, April, p. 86.

The fistula opened at the inner third of the orbitopalpebral sulcus of the left eyelid and was surrounded by three rows of cilia above and one below. The duct was lined with several layers of epithelial cells and contained muscle fibers. The duct led to the lacrimal gland and tears escaped on winking. The formation of such fistula can be explained as analogous to the formation of branchiogenic fistulas at the time of closure of the clefts between the frontal, nasal, and maxillary processes.

R. Grunfeld.

Tichvinski, B. **Corneal sensitivity in the presence of epiphora.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 1, p. 120. (See Section six, Cornea and sclera.)

Tirelli, G. **Congenital, hereditary ptosis of the upper lid.** Rassegna Ital. d'Ottal., March-April, 1935, v. 42, p. 224.

The author discusses the known facts of the laws of heredity and reviews the ocular affections of hereditary character. He cites the personal and family history of a series of cases of bilateral, congenital ptosis. The defect was transmitted as a dominant characteristic and affected thirteen out of sixteen individuals, divided among four generations.

There follows a discussion of this particular affection, quoting various authorities. Eugene M. Blake.

Van der Straeten, Appelmans, and Massa. **Symmetric hypertrophy of lacrimal and salivary glands (syndrome of Mikulicz). Orbital lymphoma. Radiotherapy.** Bull. Belge d'Opht., 1934, no. 69, p. 137.

This report brings up to date the history of a case presented to the Society in April, 1933, and confirms the author's diagnosis of "syndrome of Mikulicz," in distinction from the disease itself as described by Mikulicz.

J. B. Thomas.

Venco, L. **Gumma of the orbicularis palpebrarum.** Rassegna Ital. d'Ottal. 1935, v. 4, March-April, p. 149.

Venco's patient was a man of thirty-eight years who was free from symptoms of syphilis except for a tumor situated over the lacrimal sac and the nasal third of the left lower eyelid. It had existed for about three months and had increased in size. Histologically it showed the structure of a gumma involving the muscular fibers. The critical differentiation which characterizes specific inflammation of striated muscle is fully described. An extensive discussion of syphilitic disease of the eyelids completes the article. (Bibliography, 8 illustrations.) Eugene M. Blake.

Weekers, L. **An easy and certain operative procedure of dacryocystorhinostomy.** Arch d'Opht., 1935, v. 52, April, p. 242.

Extirpation of the lacrimal sac should give place to dacryocystorhinostomy. The author describes an operation with which even beginners on his service have had no trouble. The cause of failure in other operations is the fact that the edges of the cut sac close and grow together. Weekers avoids this by suturing the cut edge of the sac to the skin rather than to mucous membrane. (Illustrations.) Derrick Vail.

Wieczorek, A. **The correlation between the shape of the nasal bone and the size of the lacrimal fossa.** Klinika Oczna, 1935, v. 13, pt. 1, p. 39.

The search for an explanation of the greater frequency of diseases of the lacrimal sac in women than in men stimulated this investigation. Comparative measurement of 128 skulls are shown in graphs. Large and flat nasal bones are associated with a shallow lacrimal fossa, while thin and high nasal bones go with a deep nasal fossa. A close relation exists between the form of the nasal bone, the height of the lacrimal bone, and the size of the lacrimal fossa, the thin and high nose being associated with a high lacrimal bone and large lacrimal fossa. Assuming that a large lacrimal fossa is essential to development of the lacrimal sac, it is obvious that a large flat nose is indicative of conditions unfavorable to best development and function of the lacrimal passages, and that the higher and thinner the nose the more favorable are the conditions for the proper function of the sac. Ray K. Daily.

15. TUMORS

Bagchi, Sukumar. **Blindness in India.** Calcutta Med. Jour., 1934, v. 29, Dec., p. 283.

A primary sarcoma of the orbit was removed by the Krönlein route. Streptococcic infection of the orbit followed, and the author believes this to be the reason for failure of the tumor to recur, upon the same basis as the use of Coley's serum which contains streptococci. M. E. Marcove.

Batarchukov, P. **A case of chloroma of the orbit.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 1, p. 107.

The author adds a case to the seventy-nine reported in the literature. The patient was a boy, four years old, who was brought to the hospital because of an infiltrating growth of the face, with particularly marked involvement of the lids. Because at autopsy greyish nodules were found in the heart, thyroid, kidney, and bone marrow the author considers this case one of a form of leucoma. (Illustration.)

Ray K. Daily.

Beer, L. **A rare case of intraocular sarcoma.** Klinika Oczna, 1935, v. 13, pt. 1, p. 73.

The author gives a detailed microscopic report of this growth in the right eye of a child of seven years. The clinical symptoms were loss of vision and a greyish-pink reflex on focal illumination. Ray K. Daily.

Graves, R. A. **A case of retinal glioma treated by radium externally.** Trans. Ophth. Soc. United Kingdom, 1934, v. 54, p. 420.

When the left eye of a boy was being removed for glioma of the retina, a tumor was found in the right eye. Removal of the second eye was refused, so 19.502 mg. hours of radium were given. Three years later the child appeared to be in good health and could pick up toys without difficulty. The cornea was definitely hazy in the central portion, and there was some subepithelial vascularization. The upper lid was slightly distorted and trichiasis present. The lens was clear, and there was a good fundus reflex, although no fundus details could be made out. A shorter period of radium treatment is now advised. Beulah Cushman.

Heintz. **Ocular metastasis from cancer of the breast.** Bull. Soc. Belge d'Opht., 1934, no. 69, p. 25.

A woman forty-three years old first complained of poor vision in the right eye about nine months after removal of the right breast for carcinoma. Four months after the first symptoms and at the onset of painful ocular hypertension the eye was removed and was found to contain a tumor of the choroid diagnosed as "an atypical epithelioma resembling mammary cancer."

J. B. Thomas.

Hermans, R. **Xeroderma pigmentosum and ocular localizations.** Bull. Soc. Belge d'Opht., 1934, no. 69, p. 57.

This is an hereditary affection of the recessive Mendelian type, affecting the two sexes equally. Hereditary syphilis and consanguinity of the parents are often noted. The author reports a personal observation in a boy fifteen years old. The ocular region is often the first involved, and develops neoplastic lesions most rapidly. We must bear in mind xeroderma pigmentosum when we see pigmentary spots, telangiectases, xeroderma, and above all palpebral or epibulbar tumors of the lids in a young subject. In discussion Appelmans stated that he had observed two patients, brother and sister, afflicted with xeroderma. Two sisters of this same family had died of the same disease at about fifteen years of age. (Thirteen references, four illustrations.) J. B. Thomas.

Jones, A. C. **Oil cyst of the orbit with carcinomatosis.** Amer. Jour. Ophth., 1935, v. 18, June, pp. 532-535.

Koyanagi, Y. **The genesis of retinal detachment with intraocular tumors.** Graefe's Arch., 1935, v. 134, p. 62.

So-called idiopathic retinal detachment in sarcoma of the choroid is not attributable to secretion of fluid from bloodvessels but to a pathologic secretion of the retinal pigmented epithelium. In retinal glioma, the retinal pigmented epithelium shows no apparent change. In cases of glioma with advanced destruction of the tumor cells, the pigmented epithelium of the iris actively secretes. H. D. Lamb.

Lebensohn, J. E. **Primary carcinoma of the meibomian gland.** Amer. Jour. Ophth., 1935, v. 18, June, pp. 552-554.

Lowther, A. H. **Case of bilateral epithelioma of the limbus in a boy of five.** Brit. Jour. Ophth., 1935, v. 19, May, p. 264.

Each eye presented a grayish, raised, wartlike growth symmetrically placed astride the temporal limbus. The tumors were excised and the bases cauterized. Pathologic examination indicated that the masses were epitheliomata.

D. F. Harbridge.

Merkulov, I. **Experimental Roux sarcoma of the eyeball.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 2, p. 213.

The author transplanted pieces of Roux's sarcoma from the chicken's breast into various parts of the eyeball and orbit. With the exception of grafts into the cornea the transplants took,

their growth beginning 10 to 12 days after the implantation and spreading through the eyeball. The chickens died of cachexia and metastasis 25 to 52 days after implantation. Microscopic sections show development of the neoplasm from the cellular elements. (Illustrations.) Ray K. Daily.

Motolese, F. **Primary sarcoma of the lacrimal caruncle.** Boll. d'Ocul., 1934, v. 13, Nov., pp. 1433-1442.

A man of seventy-two years showed a small, pink tumor of the size and shape of a pea, connected by a thin peduncle with the caruncle. There was recurrence six and one-half months after the original tumor was removed. Histologic examination showed the original growth to be a polymorphocellular sarcoma and the second a round-cell sarcoma. (Bibliography, five figures.) M. Lombardo.

Nowkirischky, A. D. **Malignant melanoma of the lids in a child with metastases and death.** Klin. M. f. Augenh., 1935, v. 94, April, p. 521. (Ill.)

Originally a tumor of the margin of the left lower lid in a girl of eleven years had been diagnosed elsewhere as a benign papilloma. It had been repeatedly removed. Six weeks after the last extirpation the child died from bronchopneumonia and multiple metastases of malignant melanoma in almost all organs. C. Zimmermann.

Orth, Hans. **Metastases into the optic nerve in carcinoma of the breast.** Klin. M. f. Augenh., 1935, v. 94, May, p. 612. (Ill.)

A year after amputation of the right breast of a woman aged forty-nine years, the left breast had to be amputated. Shortly after this operation the patient complained of loss of sight. The right eye showed numerous pigmented spots in the retina and the left fundus presented choked disc with nodules at the vascular funnel, undoubtedly carcinomatous metastases. Three months later the left eye was totally blind from vascular thrombosis with hemorrhages and edema.
C. Zimmermann.

Patterson, H. A. **Sarcoma of the iris.** Amer. Jour. Ophth., 1935, v. 18, July, pp. 651-653.

Rintelen, F. **Hemangioblastic sarcoma of the lid, and a contribution to the classification of angioblastic tumors.** Klin. M. f. Augenh., 1935, v. 94, April, p. 463. (Ill.)

A girl of fourteen years presented a nodule in the skin of the left lower lid, 8 mm. wide, about 1 cm. high, of bluish-red color, immobile, and with moist nodular surface. It had caused slight ectropion. The subcutaneous tissue was thick and hard. The growth was extirpated and showed the structure of an endotheliomatous hemangiosarcoma, described in detail and illustrated. The classification of these tumors is discussed. C. Zimmermann.

Weskamp, C. **Glioma of the optic nerve. Report of a case.** Arch. of Ophth., 1935, v. 13, April, pp. 630-633.

Distinction between glioma of the retina (malignant) and glioma of the optic nerve (benign) is insisted upon. In a girl aged nineteen years, an optic-nerve glioma was extirpated from the left eye by Krönlein's operation. The patient's eye was in excellent condition after a year and a half. The case demonstrates that the ciliary nerves are not trophic nerves, for the eye remained well nourished even though the central artery and posterior ciliary arteries were severed. (Photographs.)
J. Hewitt Judd.

16. INJURIES

Agnello, F. **Calcareous foreign bodies in the anterior segment of the globe.** Boll. d'Ocul., 1934, v. 13, Oct., pp. 1387-1401.

Four workmen had calcareous foreign bodies embedded in the cornea or deposited on the surface of the iris. Three cases were quiet, one developed acute iridocyclitis two years after the accident. Calcareous foreign bodies do not provoke severe reaction unless germs penetrate the eyeball with them, or unless they come into contact with the ciliary body. (Bibliography, four figures.) M. Lombardo.

Bartels, M. **Injury from electric current and disease of the central nervous system.** Zeit. f. Augenh., 1935, v. 86, April, p. 1.

Bartels describes in detail the case of a patient who possibly was injured electerically and he quotes from the conflicting opinions given by several experts at the trial. Multiple sclerosis, encephalitis epidemica, and extrapyramidal disease were suggested by the patient's symptoms, but none of these diagnoses could be unequivocally made. Panse has collected the largest number of pertinent reports from the literature. Doubtless many of the lesions were wrongly attributed to the electric current. The sequelae of electric injury may be (1) muscular atrophy of the extremities, (2) a syndrome resembling multiple sclerosis, and (3) psychic disturbances attributed to fright. Ophthalmic lesions encountered were a transient Horner's syndrome, nystagmus with facial paralysis, papilledema, and ptosis. F. Herbert Haessler.

Charlin, Carlos. **Ocular condition produced by cilia in the anterior chamber.** Ann. d'Ocul., 1935, v. 172, March, pp. 225-226.

This is an addition to the report of a case of cilia in the anterior chamber previously described in Annales d'Oculistique for March, 1934. A drawing is shown of the eye as it appeared in 1922.

Filippov, H. **The need for electromagnets and their manufacture.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 3, p. 400.

This describes an electromagnet which the author made with the assistance of the electrical engineer, and the ophthalmic personnel for handling foreign-body cases in the province of Riasan. Ray K. Daily.

Hoffmann, W., and Loepp, W. **The value of x-ray examination in injuries of the orbit.** Graefe's Arch., 1935, v. 134, p. 82.

Among fractures in the region of the orbit, in the author's material at Königsberg, injuries to the outer wall represented about half of the cases. Somewhat rare were fractures in the region of the orbital roof. The fracture line was usually curved and either encircled or radiated from the center of action. Fracture-lines preferred following the sutures, particularly in fractures of the malar bone. In fractures causing injury to a nerve, displacement of the fracture ends was never observed. In all cases of traumatic disturbance of vision without retinal change, a fissure line was observed in the wall of the optic canal. It is frequently difficult to detect the line of fracture, and it may be necessary to repeat the picture while tilting the head or using a harder or softer quality of ray. Any fracture about the orbit may remain visible for a long time. In one case it could be observed ten years, and in another case five years after the accident. H. D. Lamb.

Hubin. **Ocular accidents caused by electricity; three cases.** Bull. Soc. Belge d'Opht., 1934, no. 69, p. 20.

The first case was due to short exposure of the eyes to an ultraviolet lamp. In the second, dazzling was caused by an electric arc. In the third, electric shock was followed by acute conjunctivitis, acute iritis, retrobulbar neuritis, and finally bilateral cataracts which began to form four months after the injury. J. B. Thomas.

Ives, J. E. **Effect on the eye of the yellow light of the sodium vapor lamp.** Public Health Reports, 1934, v. 49, Aug. 10, p. 931.

To determine whether continued exposure to the yellow light produced by the sodium vapor lamp has any ill effect on the eyes, one group of subjects performed clerical tasks in a room lighted only by sodium vapor lamps while another group performed similar tasks in a room lighted only by tungsten lamps, the total working time for each subject being 368 hours. Four series of eye examinations were made during the study. Sodium light had no permanent effect upon the eye, either beneficial or detrimental. A contraction of the form field of about ten degrees on the temporal side was observed under both the

tungsten and sodium lights when the examination was made during working hours. This disappeared when the subjects refrained for forty-eight hours from work requiring convergence.

Edna M. Reynolds.

Janson, E. **Traumatic myopia.** Klin. M. f. Augenh., 1935, v. 94, April, p. 517.

Janson reports twelve cases, in eight of which the myopia was transitory, disappearing within from four to thirty days. They could be explained by alteration of the curvature of the lens or by changes of the ciliary body from edema or hemorrhage, but not so well by spasm of accommodation, even in slight injuries. In one case forward displacement of the lens could be considered responsible. The only case of persistent traumatic myopia was due to forward displacement and altered shape of the lens from rupture of the zonule.

C. Zimmermann.

Koszutski, B. **Clinical observations.** Klinika Oczna, 1935, v. 13, pt. 1, p. 116. (See Section 5, Conjunctiva.)

Krol, A., and Varshavskaia, P. **Urotropin in perforating ocular injuries.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 3, p. 380.

Thirty-three cases of perforating ocular injuries, fourteen of which had intraocular foreign bodies, were treated with intravenous injections of forty percent urotropin in addition to the usual procedures. In comparison with cases treated without urotropin the outcome of these cases was better, the number of enucleated eyes lower, and the visual acuity higher.

Ray K. Daily.

Levkoeva, E. **Dislocation of the lens and its migration in Tenon's space.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 3, p. 406.

A man of seventy-three years had a perforating ocular injury nasal from the limbus, with subsequent iridocyclitis. The eye was enucleated, and a thickening on the eyeball nasal from the optic nerve raised the question of a neoplasm. On section this was found to be the dislocated lens, which had migrated backward in Tenon's capsule. (Illustrations.) Ray K. Daily.

Lukianova, E. **Experimental studies on first aid in industrial chemical ocular injuries.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 1, p. 126.

The relative effectiveness of chemical neutralization and of copious irrigation with a heavy stream of water was studied on experimental burns of rabbit eyes with sulphuric acid, caustic soda, lye, ammonia, and seventy per cent acetic acid. The eyes treated primarily with copious irrigation healed with less damage than the eyes treated with chemical neutralizer. Ray K. Daily.

Mandicevski, C. **Spontaneous iridodialysis after sudden flash of light.** Klin. M. f. Augenh., 1935, v. 94, May, p. 668.

Two cases are described. Each of the patients, men of twenty-two and sixteen years, sustained a small dialysis of the root of the iris after a flash of strong light which caused a sudden pain in the eye. A small drop of blood was noticed. Apparently the sudden contraction of the pupil was responsible. The vision was not damaged. C. Zimmermann.

Medvedev, H. **Diagnosis of injuries of the anterior segment of the eyeball.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 2, p. 195.

This is a description in Russian of Vogt's method of bone-free roentgenography, with report of cases illustrating its value. (Illustrations.)

Ray D. Daily.

Natanson, D. **Penetration of eyelashes into the anterior chamber in vocational traumatic injuries.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 2, p. 229.

Perforating corneal injury was complicated by traumatic cataract and lodgment of an eyelash in the anterior chamber. Roentgenography was negative for a foreign body. The acute inflammatory symptoms subsided after removal of the eyelash and of the swollen lens masses. Ray K. Daily.

Natanson, D. **The effect of light on the eyeball in welding.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 2, p. 223.

Of 210 workers examined thirty-five percent gave a history of photophthalmia, and 203 out of 290 eyes had diminished corneal sensitivity. The program of prophylaxis includes development of proper protective spectacles, protection of outsiders, and cooperation between oculist, hygienist, and technician in an educational campaign.

Ray K. Daily.

Protopopov, B. **Occupational rise in corneal sensitivity among the workers in the metal-plating department of the automobile factory at Gorkii.** Sovietskii Viestnik Opht., 1925, v. 6, pt. 1, p. 94.

The writer tested the corneal sensitivity of groups taken from the medical personnel, from workers not in immediate contact with electrolytic vats, from workers in immediate contact with electrolytic vats, and from machinists. The test objects were made of human hair of such length as to exert a pressure of 0.3, 1, and 10 gm. per sq. mm. of surface. Seventeen corneal points were touched. The tabulated findings show heightened corneal sensitivity in workers at electrolytic vats, and a diminished sensitivity among machinists. The author attributes the increased corneal sensitivity to the presence of compounds of chromium and cyanide in the air. The lowered sensitivity among machinists is due to chronic thickening of the corneal epithelium caused by long continued irritation from metallic dust. Ray K. Daily.

Rowland, W. D. **Ocular pathology of the new-born.** Amer. Jour. Ophth., 1935, v. 18, July, pp. 647-650.

Sanguinetti, C. **Foreign bodies in the orbit.** Boll. d'Ocul., 1934, v. 13, Oct., pp. 1362-1386.

The writer recites six cases. In some the foreign bodies penetrated the sclera and in others they lodged in the orbital cavity after passing through the eyeball. Mention is made of cases provoking lesions of the bulbar adnexa. Clinical manifestations, prognosis, and treatment are discussed. (Bibliography, twelve figures.) M. Lombardo.

Székely, J. **Corneal melanosis following scars with anterior synechiae.** Klin. M. f. Augenh., 1935, v. 94, May, p. 597. (Ill.)

In six cases pigment spots developed at the posterior surface of the cornea after perforating injuries, from agglutination or adhesion of iris to cornea. From the pigment epithelium of the iris, pigment enters the proliferating endothelial cells by phagocytosis.

C. Zimmermann.

17. SYSTEMIC DISEASES AND PARASITES

Abramovicz, I. **The nasociliary syndrome.** Klinika Oczna, 1935, v. 13, pt. 1, p. 10.

The three cases suffered from involvement of the anterior segment of the eyeball, unilateral nasal pathology, and orbitofacial neuralgia. The syndrome was first described by Charlin in 1930. Ray K. Daily.

Barrada, M. A. **Filaria in the macula.** Bull. Ophth. Soc. of Egypt, 1934, v. 27, p. 63.

About six weeks prior to examination, a boy aged fifteen years had noticed something like a black string moving in front of the left eye. The vision failed gradually for three weeks and then a sudden drop in vision occurred. There was no complaint of pain or discomfort. Examination showed a hole in the macula about one-third disc diameter in size. Projecting out of this hole was a nematode 5 or 6 cms. long in constant movement. Three months after the patient first noticed the moving thread, it suddenly disappeared for two or three days and then reappeared for a short time. At this time, the thread was about a half of its original length and the movements were very weak. After its second disappearance the filaria could not again be found in the eye, and the author expresses the opinion that it disappeared behind the retina. It was identified as Onchocerca volvulus, a filaria not before found in Egypt. A summary regarding the different species of filaria which have been recorded as affecting the eye is appended. Edna M. Reynolds.

Belgeri, F., Satanowsky, P., and Malbran, J. **The ocular changes in diabetes.**

Arch. de Oft. de Buenos Aires, 1935, v. 10, Feb.-March, p. 95.

The whole subject of diabetes and the eye is subjected to an extensive review. The only specific changes are in refraction. Neither cataract nor retinitis is directly diabetic, except the cataract which develops rapidly in a few hours from acidosis of the aqueous or in children. The characteristic form of diabetic iritis is hemorrhagic iritis with hypertension, the therapeutic indication being calcium in addition to insulin, rather than surgery. Retinosis in the diabetic is due to hypertension and angiosclerosis, appears late in the disease, and is little affected by treatment of the diabetes. Retinal lipemia, often seen in grave diabetes, is found also in other conditions. The authors have observed pure diabetic retrobulbar neuritis and consider the suddenness and the absoluteness of the centerocecal scotoma characteristic enough to distinguish it from tobacco scotoma. Retinal detachment may result from insulin. The greatest drawback to ocular surgery in the diabetic is hemorrhage, and the authors prefer not to do an Elliot operation. M. Davidson.

Buzzard, E. F., Williamson-Noble, F., Brown, W., and others. **Symposium on functional diseases of the eye.** Trans. Ophth. Soc. United Kingdom, 1934, v. 54, pp. 375-420.

Buzzard and Williamson-Noble emphasize the psychic factor in asthenopia. Brown urges that the psychologic factors at work in causing or sustaining functional diseases of the eye are identical with those underlying functional disease in general, such factors including inadequate solution of mental conflicts, faulty adjustment to the conditions of life, and a general failure to make headway along the individual's chosen path, as well as the balking of fundamental instincts, especially those of self-assertion, self-preservation, and sex. Lawson discusses functional asthenopia in childhood. Asthenopia may be present in either the clever or the backward type. Overconvergence is habitual with children.

Beulah Cushman.

Castelli, A. **Bilateral toxic ocular lesions from ankylostomiasis.** Boll. d'Ocul., 1934, v. 13, Nov., pp. 1517-1527.

A woman of twenty-two years gave a history of recurrent obscuration of the sight of both eyes, daily violent headaches, and positive scotoma in the form of a lobulated black spot in front of her right eye. The right eye showed several spots of retinochoroiditis; the left eye showed a blurred papilla, spontaneous venous pulse, and retinal edema. Both eyes showed defects of the visual fields. Fecal examination showed ova of ankylostoma, elimination of which by proper treatment was followed by disappearance of the ocular symptoms. (Bibliography.) M. Lombardo.

Cattell, R. B. **Eye complications in exophthalmic goiter.** Annals of Surg., 1934, v. 100, p. 284.

This report is based upon the findings in 4,214 cases of exophthalmic goiter treated at the Lahey Clinic in Boston.

Two cases of cataracts associated with severe chronic tetany due to parathyroid insufficiency are reported. Exophthalmos was present in one-half of the cases. No relation between the severity of the disease and the degree of exophthalmos was found but a definite parallel between the degree of exophthalmos and the duration of symptoms was demonstrated. In fifty percent of the patients who had exophthalmos before operation there was complete disappearance of the exophthalmos after operation. An additional thirteen percent showed improvement but had some remaining prominence of the eyes. In twenty-six patients exophthalmos developed postoperatively. three cases of progressive exophthalmos which resulted in the loss of both eyes are reported.

The following operative procedures were carried out in the treatment of extreme exophthalmos: Cervical sympathectomy was employed in cases of progressive exophthalmos, without relief. Plastic operations on the external canthus were of little benefit. To prevent injuries of the cornea, scarification of the lid margins with suture of the eyelids was done before operation in

acute cases of exophthalmos. In one case the lateral wall of the orbit was resected for decompression.

Edna M. Reynolds.

Duc, C. **Reflex eye symptoms in ear diseases.** Rassegna Ital. d'Ottal., 1935, v. 4, March-April, p. 207.

Duc reports the case of a man of fifty-three years who had had a radical mastoid on the left side and presented an anisocoria. Exclusion of all other causes led to the opinion that the pupillary inequality was related to the ear condition. The pupils reacted well, adrenalin solution caused moderate mydriasis but persistent anisocoria. Cocaine solution two percent dilated both pupils but accentuated the inequality, while atropin in one percent solution equalized the pupils. Other cases are abstracted and a minute description of the nerve supply at the base of the skull is copied from the work of Ruth.

Eugene M. Blake.

Jusefova, F. **The nasal nerve syndrome caused by maxillary sinusitis.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 3, p. 417.

A student twenty years of age had a keratoiritis of the left eye, associated with a left rhinorrhea and tenderness on pressure over the left nasal ala, the inner canthus, and the inner upper angle of the orbit. Rhinologic examination revealed a left maxillary sinusitis. The ocular condition began to improve immediately after the operation on the sinus. Ray K. Daily.

Lyon, M. W. **Conjunctival myiasis.** Amer. Jour Ophth., 1935, v. 18, June, pp. 547-549.

Madievskaja, E. **Ocular complications in brucellosis.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 2, p. 183.

A review of the literature precedes report of a case of bilateral iritis and neuroretinitis complicating an attack of indolent fever. The diagnosis was made on a positive Wright test. An unusual feature was persistence of marked objective changes after function was restored to normal. Ray K. Daily.

Michaïl, D. **Ocular cysticercus in Roumania.** Ann. d'Ocul., 1935, v. 172, May, pp. 385-402.

There has apparently been an increase in cysticercus infestations of the eye in Roumania since the World War. The author reports three cases personally observed and summarizes the findings in nine previously reported. The cysticerci were located as follows: subretinal, seven; vitreous, two; anterior chamber, one; suprachoroidal space, one; orbit, one.

Blood eosinophiles varied from two to eighteen percent. In one case the eosinophiles increased from two to ten percent after several retrobulbar injections of sodium chloride. The number of eosinophiles dropped sharply after removal of the cysticercus. Early surgical removal of the parasite is the treatment of choice. (Seven photographs.)

John C. Long.

Pratt, Oliver. **The influence of diet in ophthalmic practice.** Trans. Ophth. Soc. United Kingdom, 1934, v. 54, p. 497.

A diet rich in vitamins is advised for chronic and recurrent conjunctivitis, and the author found cases of migraine alleviated by proper diet.

Beulah Cushman.

Riad, M. **Ocular leprosy in Egypt.** Bull. Ophth. Soc. of Egypt, 1934, v. 27, p. 79.

After description of the various forms of leprosy with statistics regarding the incidence of eye complications, the clinical findings in 108 cases of ocular leprosy are given in detail.

Edna M. Reynolds.

Simpson, V. G. **Neurosyphilis from the standpoint of the ophthalmologist.** Med. Annals of District of Columbia, 1934, v. 3, Aug., p. 211.

The ocular abnormalities which aid in making the diagnosis of neurosyphilis and in determining its prognosis are described in detail. The anatomy of the intrinsic and extrinsic eye muscles is outlined and the pupillary changes and extraocular muscle pareses which occur in neurosyphilis are discussed. The morbid anatomy of primary optic atro-

phy is reviewed and emphasis is placed upon the fact that optic atrophy is a separate complication of tertiary syphilis and bears no relation to tabes. Optic neuritis is discussed in connection with the various forms of syphilis in which it may occur.

Edna M. Reynolds.

Stewens, H. **Subjective aspect of disease in ophthalmology.** Klin. M. f. Augenh., 1935, v. 94, April, p. 532.

Disease must be considered from the standpoint of the patient. Stewens illustrates this by examples of conjunctivitis and anomalies of refraction, which were based upon disturbances of mental equilibrium. C. Zimmermann.

18. HYGIENE, SOCIOLOGY, EDUCATION, AND HISTORY

Bichelonne, Monnier, A., and Mouton, M. **Advantages in the use of a selective yellow light.** Bull. Soc. Belge d'Opht., 1934, no. 69, p. 148.

The retinal cones are chiefly sensitive to long, the rods to short-wave radiations. The periphery of the retina presents only rods. To reduce dazzling it is advantageous to use lamps which completely absorb the violet, indigo, and blue radiations, and transmit with minimum absorption the green, orange, yellow, and red. The glass recommended by the author has a base of sulphide of cadmium and its transparent color is golden yellow. It filters with a minimum of absorption all rays of wave length above 530 millimicrons and arrests completely all below 480 millimicrons. The advantages claimed for the automobile driver are: increase of contrast, of visual acuity, of visibility; diminution of ocular fatigue, of dazzling, of time of readaptation after prolonged dazzling, of duration of the psychomotor reaction. In a lamp factory where the objects manipulated are extremely fine and delicate (about 0.1 mm.) the workers preferred to use the selective lamps provided the intensity was diminished in comparison with the white lamps previously in use. In illumination of oculists' test charts it was found that the visual acuity was increased one-tenth by use of the selective lamp. J. B. Thomas.

Chance, B. **Short studies on the history of ophthalmology. The coming of the ophthalmoscope into England.** Arch. of Ophth., 1935, v. 13, March, pp. 348-361.

Helmholtz' invention of the ophthalmoscope was preceded by the demonstration of Cumming and Babbage that the interior of the eye was not a dull black, but a colored reflecting surface. The many models which appeared rapidly after the Helmholtz model was exhibited are described by the author. Donders was the first to use the mirror with a sight-hole, and Rekoss originated the revolving discs carrying a series of lenses. In England, Spencer Wells was first to recognize the great value of the ophthalmoscope. He was followed in turn by Hutchinson, Carter, Jackson, and Allbutt. (Photographs.) J. Hewitt Judd.

Coffin, H. J. **Vocational guidance for children with defective vision.** Sight-Saving Review, 1934, v. 4, March, p. 8.

Vocational decisions for children attending sight-saving classes should be postponed as long as possible. Each pupil must be considered individually and the type of work chosen must depend on ability and personality, as well as on vision. M. E. Marcove.

Gabriels, J. A. C. **The calculation of loss of vision.** Arch. of Ophth., 1935, v. 13, April, pp. 635-636.

The author suggests the use of values of vision based on the unit of surface rather than the subtending visual angle or linear unit. He emphasizes the inherent fractional nature of the Snellen notation. A few calculations are given, one of which is that Snellen 20/30 or 6/9 means a loss of 1/3 squared or 1/9, giving 11.1 percent visual loss or a remaining visual value of 88.9 percent.

J. Hewitt Judd.

Grósz, Emile de. **Campaign against trachoma.** Brit. Jour. Ophth., 1935, v. 19, June, p. 318.

This address reviews briefly the progress of the antitrachoma campaign initiated by the International Organization. D. F. Harbridge.

Huber, Oth. **Art and the eye.** Zeit. f. Augenh., 1935, v. 86, April, p. 37.

By showing what living artists draw when made artificially astigmatic and by pointing out details in well known pictures, the author elaborates his thesis that the distortions in the works of painters and sculptors are introduced deliberately to create spiritual effects. The belief that some artists, notably El Greco, painted long heads because their presumably astigmatic eyes caused them to see images that way is entirely untenable. The author also makes some not entirely conclusive remarks on the significance of right and left in a picture. Because of the illustrations, the article should be consulted in the original. F. Herbert Haessler.

Lauber, J. **An oculist's impression on a journey through the United States.** Klinika Oczna, 1935, v. 13, pt. 1, p. 103.

The most impressive features of the ophthalmic institutions are their newness and modernity as compared with the old European institutions, the efficiency of the nonmedical hospital personnel and nurses, and the large amount of routine and unnecessary laboratory work. The value of such work is overestimated by the young generation of ophthalmologists as well as by the public, which therefore tends to turn from the private physician to institutional service. While ophthalmologists in America, as elsewhere, vary widely in skill and scholarship, many possess an unjustified confidence in their abilities; but they admit mistakes very readily, which stimulates them to further study. Ophthalmologic training is of a high level, and the short courses offered by the Academy of Ophthalmology and Otolaryngology and other societies, as well as the examinations of the American Board of Ophthalmology, tend to raise the standard of general scholarship, which promises soon to exceed that of other countries.

Ray K. Daily.

Lazarev, E. **The question of medical education.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 1, p. 62.

This is a plea for general practice and studies in neurology and laboratory technique preparatory to specializing in ophthalmology. A Soviet ophthalmologist requires a broad knowledge of the basic principles of general medicine, biology, and politics in order to be able to correlate physical diseases with the social environment. Ray K. Daily.

Levin, E., and Natanson, D. **Occupational efficiency of the blind.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 2, p. 178.

This is a discussion of blindness in relation to the classifications of the Russian disability insurance act. While the earnings of the blind might be taken into consideration in estimating compensation, loss of vision should place the worker in the class of the completely disabled. Ray K. Daily.

Litinskii, G., and Ilyiina, S. **Adaptation of the eye to various nocturnal conditions.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 1, p. 90.

The objective of this study is the development of suitable illumination for the pilot's compartment. Twelve people were tested with the Nagel adaptometer in illumination corresponding to bright moonlight, cloudy moonlight, and dawn. The adaptation curves compared with those of dark adaptation show that adaptation in cloudy moonlight is eighty percent, in bright moonlight seventy percent, and at dawn fifty-five percent. Ray K. Daily.

Livingston, P. C. **Heterophoria in aviation.** Trans. Ophth. Soc. United Kingdom, 1934, v. 54, p. 337.

The author reports on ten patients, the majority of whom had had flying experience, and after some mishap were found to have heterophoria. After exercises of the ocular muscles most of them were able to pilot an aëroplane safely. The routine treatment of muscle training as given to beginning students who show heterophoria, and to those who acquire the condition, is outlined.

Beulah Cushman.

MacCallan, A. F. **The classification of the causes of blindness.** Brit. Jour., 1935, v. 19, June, p. 338.

The author stresses the advantage of a uniform classification of the causes of blindness and submits the system of classification at present in use in Egypt.

There is no universal definition of blindness. D. F. Harbridge.

Medvedev, H. **Trachoma among Greeks in the Ukraine.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 2, p. 207.

The Greek population of the Ukraine, numbering about one hundred thousand, ranks third in trachoma prevalence, the highest percentage being among the Germans, with the Bulgarians next in line. The effect of environment is shown by the higher percentage of trachoma found among the Greeks in the German settlements. The author believes that the social and economic environment creates a specific reaction to the external irritants.

Ray K. Daily.

Meighan, S. S. **Trachoma in Glasgow.** Brit. Jour. Ophth., 1935, v. 19, June, p. 326.

Glasgow is the only city in the British Isles where trachoma is a notifiable disease. From 1914 to 1933 there were 1,039 notifications but only 613 were regarded as of definite cases. All occurred among the poorer classes.

D. F. Harbridge.

Melanowski, W. **The effect of ocular diseases on vocational aptitudes.** Klinika Oczna, 1935, v. 13, pt. 1, p. 163.

The author urges vocational guidance on the basis of the ocular condition and of the visual demands of the vocation. Such a service requires periodic eye examination and the services of medical inspectors with special training in ophthalmology and hygiene of the eye. Ray K. Daily.

Miyashita. **Legal and social measures against trachoma in Japan.** Brit. Jour. Ophth., 1935. v. 19, June, p. 323.

In 1919 Japan passed important laws on treatment of trachoma patients. Schools, workshops, hotels, and hairdresser shops are compelled to take necessary precautions. Men are subjected to an examination twice during military training. All emigrants are examined twice before being allowed to embark. D. F. Harbridge.

Rabkin, E. **Twenty-five years of the Hirschman Ophthalmologic Institute in Kharkov.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 2, p. 161.

The author describes the rapid development of this institution from a small thirty-bed hospital to a complete institute for research and teaching.

Ray K. Daily.

Rabkin, E., and Miller, I. **The problem of technical reconstruction of Soviet ophthalmology.** Sovietskii Viestnik Opht., 1935, v. 6, pt. 2, p. 242.

The backward state of ophthalmology in prerevolutionary Russia was due in large measure to the high cost of foreign instruments necessary for precise and accurate study. Liquidation of this backwardness was one of the undertakings of the Leningrad and Ukrainski Ophthalmologic Institutes. Inaugurated in 1932, it included manufacture of ophthalmologic and surgical instruments, and reconstruction of the optical industry with a higher standard in quality and type of corrective and protective lenses. Special achievements include manufacture of an electric ophthalmoscope of the American type, several types of electromagnet, binocular loupes, cross cylinders, electrically illuminated foreign-body spuds, Elschnig forceps, accommodation meters, and Stilling plates. In process of development are a slitlamp, a tonometer, a number of surgical instruments, eye prothesis, contact lenses, and so on.

Ray K. Daily.

Smith, M. E. **A program of eye health in a school system.** Sight-Saving Review, 1934, v. 4, June, p. 94.

A tentative outline is given. Natural lighting, artificial lighting, and classroom decorations, furnishings, and equipment are discussed, with recommendations and also a statement of minimum requirements.

M. E. Marcove.

Velhagen, K., Jr. **Neophan glasses.** Klin. M. f. Augenh., 1935, v. 94, May, p. 593.

The absorbing factor of neophan glass is oxide of neodym. It largely absorbs the yellow part of the spectrum, less the red, and still less the green. It increases color contrast and makes the

details of the landscape much clearer, especially in misty weather. In none of thirty-one congenital cases of disturbance of color sense did it enable the examined to read the plates of Ishihara correctly. C. Zimmermann.

Zachert, M. **The campaign against trachoma in 1933.** Klinika Oczna, 1935, v. 13, pt. 1, p. 177.

This is a statistical report.

Ray K. Daily.

Zachert. **Social and administrative measures against trachoma.** Brit. Jour. Ophth., 1935, v. 19, June, p. 321.

In Poland a special government department directs the antitrachoma campaign for prevention and treatment. Poland occupies an unfavorable frontier position between eastern Europe, where trachoma is prevalent, and western Europe, where it is less common. There is a trachoma dispensary for every 80,000 persons in an area of about 386 square miles. The Red Cross organization has created two traveling hospitals and the government has established two trachoma schools where 400 children are treated and educated.

D. F. Harbridge.

NEWS ITEMS

Edited by Dr. H. Rommel Hildreth
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News items should reach the Editor by the twelfth of the month.

Deaths

Dr. Frank Allport, Nice, France, died August 3, aged 78 years.

Dr. Westley Wright, Columbus, Ohio, died May 23, aged 92 years.

Miscellaneous

On their way to the meeting of the British Medical Association in Melbourne, Australia (in the week of September ninth), a British medical party of about 125 including physicians with their wives and friends traveled across the United States, leaving Chicago August 8, and reaching the Grand Canyon of the Colorado River on August 11. The tour around the world was planned to occupy one hundred days. At the Grand Canyon the party was met by, among others, Dr. Delamere F. Harbridge as secretary of the Arizona State Medical Association. The Association presented each visiting physician with an Indian paper cutter made of native copper, stamped with the emblem of the Arizona Association and engraved by the Hopi Indians with Indian symbols. To the visiting ladies were presented Indian bracelets of silver, similarly engraved by the Hopis.

Societies

The All-India Ophthalmological Society held its Fourth Conference at Madras on April 22, 23, 24, 1935. The President Elect was Lt. Col. R. E. Wright, Professor of Ophthalmology and Superintendent of the Government Ophthalmic Hospital, Madras. On the first day, Dr. E. V. Srinivasan, on behalf of the Reception Committee, welcomed the members; the Secretary, Dr. G. Zacharian, introduced Sir Mahomed Usman, Ex-Acting-Governor of Madras, who opened the session with a short address which dealt with the history of the Government Ophthalmic Hospital, Madras, and its influence in the spread of Ophthalmology in India. Colonel Wright then delivered the Presidential address.